# SMOOTH STRUCTURES ON ESCHENBURG SPACES: NUMERICAL COMPUTATIONS

#### LEO T. BUTLER

ABSTRACT. This paper numerically computes the topological and smooth invariants of Eschenburg-Kruggel spaces with small fourth cohomology group, following Kruggel's determination of the Kreck-Stolz invariants of special Eschenburg spaces [5, 10, 7]. The GNU GMP arbitrary-precision library is utilised [6].

#### 1. Introduction

In [1], Aloff and Wallach introduced a family of 7-manifolds that are homogeneous spaces of SU<sub>3</sub> as follows: let p,q be coprime integers and let  $U_{p,q} \subset SU_3$ be the subgroup of diagonal matrices of the form  $\operatorname{diag}(z^p, z^q, z^{-p-q})$  for  $z \in S^1$ . The Aloff-Wallach 7-manifold  $M_{pq} = SU_3/U_{p,q}$ . Aloff and Wallach showed that a bi-invariant metric on SU<sub>3</sub> induced a positively-curved submersion metric on the quotient  $M_{p,q}$ . In [7, 8], Kreck and Stolz studied the topological and smooth classification of Aloff-Wallach spaces. Amongst other things, they showed that there are diffeomorphic Aloff-Wallach spaces that are not SU<sub>3</sub> equivariantly diffeomorphic: the 'smallest' example occurs with (p,q) equal to (-4638661,582656) and (-2594149, 5052965)! [8, p. 468] Each of these spaces has a finite cyclic fourth integral cohomology group; they showed, through a computer search, that if the order of  $H^4(M_{p,q}; \mathbf{Z})$  is less than r = 295527597, then the topological structure determines the smooth structure. Additional computer searches, attributed to Zagier and Odlyzko, revealed homeomorphic, but not diffeomorphic, Aloff-Wallach spaces with the rank of  $H^4(M_{p,q}; \mathbf{Z})$  between the above number and roughly  $2 \times 10^{20}$ [8, p. 467]. In all cases, there were no reported examples of a topological Aloff-Wallach space whose 28 distinct smooth structures are themselves diffeomorphic to Aloff-Wallach spaces.

In [5], Eschenburg introduced a family of 7-manifolds that generalise Aloff-Wallach spaces [10]. Let  $U \cong U_1$  be a subgroup of  $U_3 \times U_3$  such that the natural action of U on  $U_3$  defined by

$$\forall u = (u_1, u_2) \in U, g \in U_3: \qquad u \cdot g = u_1 g u_2^{-1}$$
 (1)

stabilises SU<sub>3</sub> and is free. U is conjugate to a diagonal subgroup characterised by 2 integer vectors k and  $l \in \mathbb{Z}^3$  such that  $k_0 + k_1 + k_2 = l_0 + l_1 + l_2$ :

$$U_{kl} = \left\{ \operatorname{diag}(z^{k_0}, z^{k_1}, z^{k_2}) \oplus \operatorname{diag}(z^{l_0}, z^{l_1}, z^{l_2}) : z \in S^1 \right\}.$$
 (2)

The freeness of the action (1) is equivalent to the property that

$$\forall$$
 permutations  $\sigma$ :  $k - \sigma(l)$  is a primitive vector in  $\mathbf{Z}^3$ . (3)

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Eschenburg defined k, l to be admissible if

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**Definition 1.** Let  $k, l \in \mathbb{Z}^3$  satisfy  $k_0 + k_1 + k_2 = l_0 + l_1 + l_2$  and the admissibility conditions (4) and define  $U_{kl}$  as in (2). The 7-manifold  $E_{kl} := SU_3/U_{kl}$  is called an Eschenburg space.

Eschenburg computed the integral cohomology ring of  $E_{k,l} = SU_3/U_{k,l}$  and proved that these spaces were strongly inhomogeneous in most cases. He also showed that under certain conditions on k, l, a bi-invariant metric on  $SU_3$  induces a positively-curved submersion metric on  $E_{k,l}$ .

In [10], Kruggel computed the Kreck-Stolz invariants of a broad number of Eschenburg spaces—henceforth an Eschenburg-Kruggel space—and obtained a classification of these Eschenburg-Kruggel spaces up to homotopy, homeomorphism and diffeomorphism. In [4], Chinburg, Escher and Ziller implemented a computer search for homeomorphic, but not diffeomorphic, positively-curved (resp. 3-Sasakian) Eschenburg-Kruggel spaces. They found that for  $\#H^4(E_{k,l};\mathbf{Z}) < 8000$ , there is a unique pair of homeomorphic, but not diffeomorphic, positively-curved Eschenburg-Kruggel spaces. In [3], the present author proved that the existence of a real-analytically completely integrable convex Hamiltonian is a non-trivial smooth invariant of the configuration space, and proved the complete integrability of geodesic flows on all Eschenburg-Kruggel spaces. That work motivated the

**Question 1.** Let E be a topological Eschenburg space. Is each smooth structure on E diffeomorphic to an Eschenburg space  $E_{k,l}$ ?

One knows from the work of Kreck and Stolz that each topological Eschenburg space admits 28 distinct oriented smooth structures, but one does not know if each structure is represented by an Eschenburg space. From the above-mentioned results, it is not clear whether each distinct oriented smooth structure on a topological Eschenburg space is represented by an Eschenburg space or if such representatives are rather sparse, as for Aloff-Wallach spaces. This note attempts to cast some light on this question.

**Theorem 1.** Let I = [-850, 850] and J = [1, 101]. Amongst the Eschenburg-Kruggel spaces with  $(k, l) \in I^3 \times I^3$ , for each odd  $|r| = \#H^4(E; \mathbf{Z})$  in the interval J, columns 2 & 9 of Table 1 show a lower bound on the number of oriented homeomorphism classes. For  $|r| \leq 9$ , each oriented homeomorphism class of Eschenburg-Kruggel spaces has each of its 28 distinct oriented smooth structures represented by an Eschenburg-Kruggel space  $E_{k,l}$  with  $(k,l) \in I^3 \times I^3$ .

**Remark 1.** Columns 3–7 & 10–14 of Table 1 list the number of topological Eschenburg-Kruggel spaces, for a fixed |r|, that have the stated number of oriented smooth structures represented by Eschenburg-Kruggel spaces.

The smooth structures on a topological Eschenburg-Kruggel space are an orbit of the group of homotopy 7-spheres ( $\cong \mathbf{Z}_{28}$ ). The Kreck-Stolz invariant  $s_1$  is additive under this action: if  $\Sigma$  is a homotopy 7-sphere and E is an Eschenburg-Kruggel space, then  $s_1(E\#\Sigma) = s_1(E) + s_1(\Sigma)$  and  $28 \cdot s_1(\Sigma) \equiv 0 \mod 1$ . This implies that each topological Eschenburg-Kruggel space has 28 distinct oriented smooth structures [10]. The difficulty is that the surgery description of the smooth structure  $E\#\Sigma$  does not appear to contain information about the structure of  $E\#\Sigma$  as a Eschenburg-Kruggel space.

Tables 5–7 list representative Eschenburg-Kruggel spaces for each smooth structure on each topological Eschenburg-Kruggel space with  $|r| \le 5$  that was found in

constructing table 1. It seems likely that all topological and smooth Eschenburg-Kruggel spaces with  $|r| \le 5$  are enumerated in tables 5–7.

Table 1: $ r  = \operatorname{rank} H^4(E; \mathbf{Z})$ versus the number of homeomorphism classes (#Top.), and the number of home-
omorphism classes with the $n$ smooth structures represented by Eschenburg-Kruggel spaces, for $n = 28, 27$ ,
14 < n < 26, 2 < n < 13 and $n = 1$ .

				Count	s						Counts	5	
r	#Top.	28	27	14-26	2-13	1	r	#Top.	28	27	14-26	2-13	1
1	12	12					3	8	8				
5	48	48					7	120	120				
9	24	24					11	360	354	4	2		
13	576	542	22	12			15	32	32				
17	1152	988	68	96			19	1512	1216	86	204	6	
21	80	64	10	6			23	2640	1726	276	598	40	
25	240	240					27	72	72				
29	4704	1656	814	2212	22		31	5760	1506	794	3080	380	
33	240	114	30	92	4		35	480	230	90	160		
37	8634	904	918	5728	1072	12	39	384	118	58	176	32	
41	11988	376	636	8778	2176	22	43	12600	272	500	9412	2414	2
45	96	60	20	16			47	17108	82	248	10950	5812	16
49	1848	1028	310	510			51	768	44	26	522	176	
53	22456	46	122	11414	10836	38	55	1440	320	200	752	168	
57	1008	28	36	666	278		59	29902	10	32	10662	19034	164
61	32874	22	76	9468	22764	544	63	240	60	10	164	6	
65	2304	178	220	1332	574		67	39854	12	28	7890	31108	816
69	1756			864	878	14	71	47544			6596	39738	1210
73	48034	2	10	6090	40864	1068	75	160	50	42	68		
77	3600	332	112	1914	1234	8	79	59046		4	4508	51962	2572
81	216	188	22	6			83	67340			3544	59816	3980
85	4602	28	82	2670	1800	22	87	3128			580	2522	26
89	78944			2068	70090	6786	91	5740	256	154	2502	2734	94
93	3788			468	3182	138	95	6016	18	22	2836	3054	86
97	91772			1484	79690	10598	99	720	12	40	474	194	
101	100490			742	87290	12458							

This note is structured as follows: section 2 reviews Kruggel's condition C; section 3 reviews Kruggel's computation of the Kreck-Stolz invariants; section 4 explains how the Kreck-Stolz invariants were computed in software; and appendices 5.1–5.4 add several tables.

## 2. ESCHENBURG-KRUGGEL SPACES

To compute the Kreck-Stolz invariants of Eschenburg spaces, Kruggel observed that the projection of an  $x \in SU_3$  onto its first two columns in the Steifel manifold  $V_2(\mathbf{C}^3)$  is a diffeomorphism. From the embedding of  $V_2(\mathbf{C}^3) \subset \mathbf{C}^{2\cdot 3}$ , Kruggel constructed an 8-manifold W' with boundary  $V_2(\mathbf{C}^3)$ . The action of  $U_{kl}$  descends naturally to  $\mathbf{C}^{2\cdot 3}$  and W', but the action on W' has 3 singular orbits. One can cut away these three singular orbits to construct a cobordism between  $E_{kl}$  and a union of 3 lens spaces – provided that the matrix

$$A = \begin{bmatrix} k_0 - l_0 & k_0 - l_1 & k_0 - l_2 \\ k_1 - l_0 & k_1 - l_1 & k_1 - l_2 \\ k_2 - l_0 & k_2 - l_1 & k_2 - l_2 \end{bmatrix}$$
 (5)

has a column or row containing non-zero, pairwise coprime entries.

**Definition 2** (Kruggel 2006). The Eschenburg space  $E_{k,l}$  satisfies condition C iff the matrix A has a column or row containing non-zero, pairwise coprime entries. An Eschenburg space that satisfies condition C is called an Eschenburg-Kruggel space.

**Remark 2.** Note that the coprimality conditions (4) do not imply that all entries of A are non-zero. The Eschenburg space  $E_{kl}$  with k = (-1, -1, 2) and l = (-2, 0, 2)

has

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$$A = \begin{bmatrix} 1 & -1 & -3 \\ 1 & -1 & -3 \\ 4 & 2 & 0 \end{bmatrix} . \tag{6}$$

This defines an Eschenburg-Kruggel space according to definition 2. Indeed, the coprimality conditions (4) are satisfied, since they are

$$\gcd(A_{00}, A_{11}), \quad \gcd(A_{00}, A_{12}), \quad \gcd(1, -1), \quad \gcd(1, -3), \\
\gcd(A_{01}, A_{10}), \quad \gcd(A_{01}, A_{12}), \quad i.e. \quad \gcd(-1, 1), \quad \gcd(-1, -3), \\
\gcd(A_{02}, A_{10}), \quad \gcd(A_{02}, A_{11}) \quad \gcd(-3, 1), \quad \text{and } \gcd(-3, -1)$$

which are all unity; and condition C is satisfied by the left-most column of A. See remark 3 for more.

### 3. Invariants of Eschenburg-Kruggel spaces

Let  $E_{kl}$  be an Eschenburg space. Let u be the Chern class of the bundle  $S^1 = U_{kl} \hookrightarrow SU_3 \to E_{kl}$ . Eschenburg proved that the non-trivial parts of the integral cohomology ring of  $E_{k,l}$  has the following structure:

$$H^{2}(E_{kl}; \mathbf{Z}) = \mathbf{Z} \cdot u, \qquad H^{4}(E_{kl}; \mathbf{Z}) = \mathbf{Z}_{r} \cdot u^{2}.$$
 (8)

The integer  $r = \sigma_2(k) - \sigma_2(l)$  where  $\sigma_j$  is the *j*-th elementary symmetric polynomial,  $\sigma_j(x) = \sum_{i_1 < \dots < i_j} x_{i_1} \cdots x_{i_j}$ . The linking form of  $E_{k,l}$  is plainly determined by the linking number of  $u^2$  with itself. Kruggel showed that this equals

$$Lk(u^2, u^2) = -\frac{s^{-1}}{r} \mod 1,$$
 (9)

where  $s = \sigma_3(k) - \sigma_3(l)$  and  $s^{-1}$  is the multiplicative inverse of  $s \mod r$ . Kruggel also showed that the first Pontryagin class of  $E_{kl}$  equals

$$p_1(E_{kl}) = p_1 \cdot u^2 \mod r$$
 where  $p_1 = 2\sigma_1(k)^2 - 6\sigma_2(k)$ . (10)

Although this expression appears to be asymmetric in k and l, the sum condition plus the definition of r ensures that it is well-defined.

In addition to the above invariants, Kruggel was able to compute the Kreck-Stolz invariants for Eschenburg-Kruggel spaces. To explain, let  $p \neq 0$  be coprime to the non-zero integers  $p_0, \ldots, p_3$ , and let

$$L = L(p; p_0, p_1, p_2, p_3) = S^7 / C \text{ where}$$

$$C = \{ \operatorname{diag}(e^{\frac{2\pi i k p_0}{p}}, e^{\frac{2\pi i k p_1}{p}}, e^{\frac{2\pi i k p_2}{p}}, e^{\frac{2\pi i k p_3}{p}}) : k = 0, \dots, p - 1 \}$$
(11)

be a lens space. Define the following functions

$$s_1(L) = \frac{1}{2^7 \cdot 7 \cdot p} \sum_{k=1}^{|p|-1} \prod_{j=0}^{3} \cot\left(\frac{k\pi p_j}{p}\right) + \frac{1}{2^4 \cdot p} \sum_{k=1}^{|p|-1} \prod_{j=0}^{3} \csc\left(\frac{k\pi p_j}{p}\right) \mod 1 \quad (12)$$

$$s_2(L) = \frac{1}{2^4 \cdot p} \sum_{k=1}^{|p|-1} \left( e^{\frac{2\pi i k}{p}} - 1 \right) \prod_{j=0}^{3} \csc\left(\frac{k\pi p_j}{p}\right)$$
 mod 1

These are the Kreck-Stolz invariants of the lens space L in (11), and they take values in  $\mathbf{Q}/\mathbf{Z}$ .

Assume that the left-most column of the matrix A has pairwise coprime, non-zero entries (the remaining cases are described below). The above-described cobordism exhibits  $E_{kl}$  as cobordant to the disjoint union of the three lens spaces:

$$L_0 = L(A_{00}; A_{10}, A_{20}, A_{11}, A_{21}) \qquad L_1 = L(A_{10}; A_{00}, A_{20}, A_{01}, A_{21})$$
  

$$L_2 = L(A_{20}; A_{00}, A_{10}, A_{01}, A_{11}). \tag{13}$$

Let us see that  $L_0$  is indeed a lens space. By condition C, the integers  $A_{j0}$  are pairwise coprime and non-zero. The primitivity condition (3) implies that  $A_{00}$  is coprime to  $A_{11}$  and  $A_{21}$ . For example, suppose that  $A_{00}$  and  $A_{11}$  have a divisor d>1, so one can write  $A_{00}+A_{11}=dc$ . The condition that  $\sum k_i=\sum l_i$  in definition 1 is equivalent to  $A_{00}+A_{11}+A_{22}=0$ , so  $A_{22}=-dc$ . If c=0, then the vector  $k-l=(A_{00},A_{11},A_{22})$  is not primitive; if  $c\neq 0$ , then the same vector is not primitive, too. (This argument also shows that if  $A_{22}=0$ , then  $A_{00}=-A_{11}=\pm 1$ .) The remaining verifications for  $L_1$  and  $L_2$  are similar.

Kruggel showed that the Kreck-Stolz invariants are equal to

$$s_1(E_{kl}) = \frac{\text{sign}(w)}{2^5 \cdot 7} - \frac{q^2}{2^7 \cdot 7 \cdot w} - \sum_{i=1}^3 s_1(L_i)$$
 mod 1 (14)

$$s_2(E_{kl}) = \frac{q-2}{2^4 \cdot 3 \cdot w} - \sum_{i=1}^3 s_2(L_i)$$
 mod 1 (15)

where

$$q = A_{00}^2 + A_{10}^2 + A_{20}^2 + A_{01}^2 + A_{11}^2 + A_{21}^2 - (l_0 - l_1)^2,$$
(16)

$$w = r \cdot A_{00} A_{10} A_{20}. \tag{17}$$

These invariants are transcendental functions of the variables k, l. This fact, plus the fact that the sums can have a rather large number of terms, means that showing two Eschenburg-Kruggel spaces are homeomorphic or diffeomorphic is rather difficult. However, since  $s_i$  is a rational integer, one can use a few numerical tricks to prove equality of these invariants.

**Remark 3** (c.f. remark 2). The well-definedness of Kruggel's formulae (14–15) amounts to the statement that if  $E_{k,l}$  satisfies condition C, then w (17) does not vanish. Indeed, from the remark above, the lens-space invariants  $s_j(L_i)$  (12–13) are well-defined if  $w \neq 0$ . Since condition C is assumed to hold for the left-most column of A,  $A_{00}A_{10}A_{20} \neq 0$ . In addition, Kruggel proved that r must be odd [10, p. 572] (in fact, since  $H^3(E_{k,l}; \mathbf{Z})$  vanishes, Poincaré duality implies  $r \neq 0$ ). Therefore,  $w \neq 0$ .

The results of this note rely on

**Theorem 2** (Kruggel 2005). Two Eschenburg-Kruggel spaces,  $E_{k,l}$  and  $E_{k',l'}$  are orientation-preserving homeomorphic if |r|, s,  $p_1$  and  $s_2$  coincide. If, in addition,  $s_1$  coincides, then they are orientation-preserving diffeomorphic.

3.1. Automorphisms and invariants. To compute the Kreck-Stolz invariants of Eschenburg-Kruggel spaces in general, one uses the extension of the natural action of Weyl group of  $SU_3 \times SU_3$  by the automorphism that interchanges factors. Concretely, let  $S_3$  be the symmetric group acting naturally on  $\mathbf{Z}^3$  by permutations, let  $\tau$  be the involutive automorphism of  $\mathbf{Z}^3 \oplus \mathbf{Z}^3$  which acts by  $(k, l) \mapsto (l, k)$  and let  $\eta: (k, l) \mapsto (-k, -l)$ .

The group generated by  $S_3 \times S_3$ ,  $\tau$  (resp.  $S_3 \times S_3$ ,  $\tau$  and  $\eta$ ) is denoted by  $\mathfrak{G}^+$  (resp.  $\mathfrak{G}$ ).  $\mathfrak{G}$  is a group of order 144 and  $\mathfrak{G}^+$  is an index 2 subgroup.

**Proposition 1** ([5]). For each  $\sigma \in \mathfrak{G}$ , the Eschenburg spaces  $E_{k,l}$  and  $E_{\sigma(k,l)}$  are diffeomorphic. If  $\sigma \in \mathfrak{G}^+$ , they are orientation-preserving diffeomorphic.

**Remark 4.** With the above proposition, the formulae for the Kreck-Stolz invariants can be extended to all Eschenburg-Kruggel spaces as follows. The Eschenburg space  $E_{kl}$  is orientation-preserving diffeomorphic to  $E_{\alpha(k),\beta(l)}$  for any permutations  $\alpha, \beta \in S_3$ . In addition,  $E_{k,l}$  is orientation-preserving diffeomorphic to  $E_{l,k}$ . The

permutation  $\alpha$  permutes the rows (resp.  $\beta$  permutes the columns) of A, while the diffeomorphism  $E_{kl} \to E_{lk}$  induces  $A \mapsto -A'$ .

It follows that if the column j (resp. row j) of A has non-zero pairwise coprime entries, then the leftmost column of  $A_{k,\beta(l)}$  (resp.  $A_{l,\beta(k)}$ ) has non-zero pairwise coprime entries and  $E_{kl}$  is orientation-preserving diffeomorphic to  $E_{k,\beta(l)}$  (resp.  $E_{l,\beta(k)}$ ) where  $\beta = (0 j)$ . By this observation, one can compute the Kreck-Stolz invariants of any Eschenburg-Kruggel space by means of the formulae (14,15).

The proposition also implies that each Eschenburg space  $E_{k,l}$  has a representative, up to orientation, where  $k_0 \le k_1 \le k_2$ ,  $l_0 \le l_1 \le l_2$  and  $k_0 \le l_0$ .

### 4. Methodology

The search for homeomorphic smooth Eschenburg-Kruggel space neatly divides into three separate searches:

- (1) search over a domain of parameters  $(k, l) \in \mathbf{Z}^3 \times \mathbf{Z}^3$  for Eschenburg-Kruggel spaces:
- (2) computation of the invariants r, s,  $p_1$  and  $s_1$ ,  $s_2$  in terms of the parameters (k, l):
- (3) search the data generated for matching invariants.

Due to the size of the sample space considered, it was decided to do the first two steps in compiled code. The structure of the problem led to the choice of C++ as the language of choice.

The computations to generate all of the tables in this note took approximately six weeks of continuous cpu time on a single core of a 2-core 3.0GHz Intel Core Duo E6850 cpu with 4MB cache and 3.3GB DDRAM 4.0GB swap. The operating system was RHEL with the 2.6.8 Linux kernel.

- 4.1. The search over parameter space. Let us define the parameter space and explain how the search is conducted.
- 4.1.1. The parameter space. Let  $\mathbf{1} \in \mathbf{Z}^3$  be the vector whose elements are all unity. If  $E_{k,l}$  is an Eschenburg space, then  $E_{k+n\mathbf{1},l+n\mathbf{1}}$  is the same Eschenburg space for any  $n \in \mathbf{Z}$ . There is, therefore, a unique representative of  $(k,l) + \mathbf{Z}(\mathbf{1},\mathbf{1})$  such that  $\sum k_i = \sum l_i \in [0,2]$ . All searches were conducted with this constraint.
- 4.1.2. The search. The speed of the arithmetic in the native signed long int class of integers in C++ argued in favour of performing testing the admissibility condition (4) and condition C (definition 2) in signed long int.

The coprimality tests are conducted by a two-part process. First, an  $N \times N$  lookup table is created. The (i,j) entry of the lookup table equals 1 if i and j are coprime and  $ij \neq 0$ ; otherwise, it is 0. If |i| or |j| exceed N, the Euclidean algorithm is first employed to reduce both i and j until the lookup table can be used. The parameter N is chosen at compile time; in our tests N=2000 was chosen so that all coprimality tests required only a lookup.

4.2. Computation of the invariants. This is broken into two parts.

<sup>&</sup>lt;sup>1</sup>In tables 5–7, one finds the sums reported lie in [-2,2]. Those spaces with sum reported in [-2,-1] are obtained by reversing the orientation of a space whose sum lies in [1,2].

4.2.1. Integer invariants. If (k,l) define an Eschenburg-Kruggel space, then the rank of  $H^4(E; \mathbf{Z})$ , |r|, and the first Pontryagin class  $p_1$  were computed using signed long int arithmetic. Since the set of signed long ints equals  $[-2^{31}, 2^{31} - 1] \cap \mathbf{Z}$ , and both r and  $p_1$  are quadratic forms in (k, l), signed long int arithmetic does not run into under/overflow errors for  $|k_i| < 10922$ . For the purposes of this note, all computations of r and  $p_1$  were done in signed long int arithmetic.

Since s is cubic in (k, l), under/overflow does not affect computation for  $|k_i|, |l_i| < 1023$ . This relatively small bound led us to use GMP arbitrary precision floats to compute s (see below).

4.2.2. Rational invariants. From the definition of the Kreck-Stolz invariants (12), one can see that individual terms in each summand can be  $O(1/p^3)$ .

The GNU GMP package, along with its GMPFRXX front-end for C++, permit one to do arbitrary precision arithmetic from within C++ [6, 14]. Since GNU GMP can compute the trigonometric functions to arbitrary precision, we elected to use this package to compute the Kreck-Stolz invariants of an Eschenburg-Kruggel space.

The relative slowness of software-implemented arithmetic also indicated a need to permit computation with machine-native floating point arithmetic. The template facility of C++ made it possible to use the same code for both machine-native and software-implemented floating-point arithmetic and allow the user to choose the precision at run-time rather than compile-time.

- 4.3. Matching invariants. The final step was to match the topological and smooth invariants that are computed for different Eschenburg-Kruggel spaces. This was accomplished, in essence, by multiple sorts. In the first step, a C++ programme computed and sorted approximately 2GB of the polynomial Eschenburg-Kruggel space invariants  $(r, s, p_1)$ . These data were stored in text files, and these were sorted and split according to the value of |r|. The Kreck-Stolz invariants of these spaces were computed with 130 bits of precision and stored in a second database. The resulting data were imported into a second C++ programme where homeomorphism and diffeomorphism classes were computed. The data for tables 1–7 were generated in this way.
- 4.3.1. *Testing*. To ensure the accuracy of the computations, several tests were designed. These included:
  - (1) replication of each of the published computations in [2, section 4], table 1 of [10] and tables 1-6 of  $[4]^2$  and table 1 of [10];
  - (2) replication, up to a numerical  $\epsilon \sim 2^{-130}$ , of closed-form answers for the invariants of some Eschenburg-Kruggel space;
  - (3) replication, up to a numerical  $\epsilon\sim 2^{-130},$  of the C++ computed results in Maple, Maxima and Bc [11, 12, 13].

# 5. Appendices

5.1. **Appendix A.** The graph in figure 1 graphs the number N of Eschenburg-Kruggel spaces in the cube  $[-k,k]^6$ , as a function of k, with the constraint that  $\sum k_i = \sum l_i \in [0,2]$ . A rough heuristic indicates that  $N = O(k^4)$  for large k and  $\Delta N = O(k^3)$ —which is nicely captured here. It is also apparent that  $\Delta N(k)$  grows like  $c_{\pm}k^3$ , where  $c_{\pm}$  depends only on the parity of k.

<sup>&</sup>lt;sup>2</sup>In replicating these results, differing conventions for the projection map  $x \mapsto \bar{x} \in (-\frac{1}{2}, \frac{1}{2}]$  became apparent. The Chinburg-Escher-Ziller code uses the convention that x is reduced mod 1, then  $[0, \frac{1}{2}]$  is mapped to itself by the identity and  $(\frac{1}{2}, 1]$  is mapped to (-1, 0] by a constant shift. In our C++ code, x is reduced mod 1, then shifted by  $-\frac{1}{2}$ .

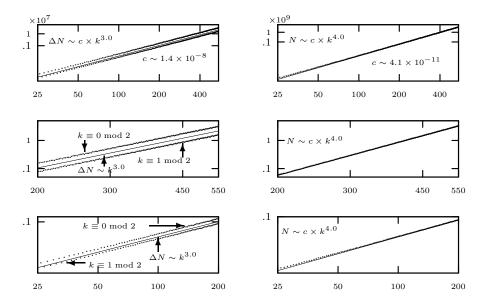


Figure 1: [Log-Log scale]. The number of Eschenburg-Kruggel spaces, N = N(k), and the marginal number,  $\Delta N = \Delta N(k)$ , in the cube  $[-k, k]^6$ . Left column, descending: the marginal number for k in the intervals [25, 550], [200, 550] and [25, 200]; Right column, descending: the total number for the same intervals. A least-squares regression line is also displayed on each graph.

5.2. **Appendix B.** We observed several unexplained phenomena. For fixed invariants r, s and  $p_1$ , the Kreck-Stolz invariant  $s_2$  appears to lie in the orbit of  $\mathbf{Z}_n$  acting by  $x \mapsto x + \frac{1}{n} \mod 1$  where n = 4 or 12. We also observed that the values taken on by  $s_1$  appear to depend only on |r|, s and  $p_1$ .

The first columns of Tables 2 and 3 shows these group actions on the Kreck-Stolz invariants, when |r| = 1, 3. Table 4 abstracts the picture from tables 2 and 3, and shows the group actions on  $s_2$  and  $s_1$ . It appears that  $\mathbf{Z}_{12}$  acts effectively except when  $r \equiv 0 \mod 3$ ,  $r \not\equiv 0 \mod 3^2$ , in which case  $\mathbf{Z}_4$  acts effectively.

Additional tables are available at http://www.maths.ed.ac.uk/~lbutler/kspace/.

Table 4: A summary of the invariants of Eschenburg-Kruggel spaces, where  $k \in \mathbf{Z}_{12}, \ l \in \mathbf{Z}_{28}$  and  $s_1, s_2$  take values in  $\left[-\frac{1}{2}, \frac{1}{2}\right] \mod 1$ .

r	s	$p_1$	$s_2$	$s_1$	r	s	$p_1$	$s_2$	$s_1$
1	0	0	0/1 + k/12	-1/2 + l/28					
3	-1	0	2/9 + k/4	-55/112 + l/28	3	1	0	1/36 + k/4	-53/112 + l/28
5	-2	2	0/1 + k/12	-69/140 + l/28	5	-1	-2	1/60 + k/12	-131/280 + l/28
5	1	-2	1/15 + k/12	-139/280 + l/28	5	2	2	0/1 + k/12	-33/70 + l/28
7	-3	-3	1/84 + k/12	-389/784 + l/28	7	-3	1	1/28 + k/12	-373/784 + l/28
7	-3	2	0/1 + k/12	-365/784 + l/28	7	-2	0	1/42 + k/12	-53/112 + l/28
7	-1	0	1/21 + k/12	-53/112 + l/28	7	1	0	1/28 + k/12	-55/112 + l/28
7	2	0	5/84 + k/12	-55/112 + l/28	7	3	-3	1/14 + k/12	-367/784 + l/28
7	3	1	1/21 + k/12	-383/784 + l/28	7	3	2	0/1 + k/12	-391/784 + l/28
9	-4	0	2/27 + k/12	-1/2 + l/28	9	4	0	1/108 + k/12	-1/2 + l/28
11	-5	-5	1/66 + k/12	-83/176 + l/28	11	-5	-1	1/33 + k/12	-597/1232 + l/28
11	-5	4	1/132 + k/12	-87/176 + l/28	11	-4	-4	5/66 + k/12	-577/1232 + l/28
11	-4	2	0/1 + k/12	-87/176 + l/28	11	-4	5	1/22 + k/12	-597/1232 + l/28
11	-3	-1	1/44 + k/12	-577/1232 + l/28	11	-3	2	0/1 + k/12	-83/176 + l/28
11	-3	3	5/66 + k/12	-573/1232 + l/28	11	-2	-4	3/44 + k/12	-615/1232 + l/28
11	-2	-3	1/66 + k/12	-579/1232 + l/28	11	-2	1	7/132 + k/12	-607/1232 + l/28
11	-1	-5	5/66 + k/12	-573/1232 + l/28	11	-1	-3	1/33 + k/12	-597/1232 + l/28
11	-1	-2	1/132 + k/12	-577/1232 + l/28	11	1	-5	1/132 + k/12	-615/1232 + l/28

				Table 4, continued	from p	oreviou	s page		
r	s	$p_1$	$s_2$	$s_1$	r	s	$p_1$	$s_2$	$s_1$
11	1	-3	7/132 + k/12	-591/1232 + l/28	11	1	-2	5/66 + k/12	-611/1232 + l/28
11	2	-4	1/66 + k/12	-573/1232 + l/28	11	2	-3	3/44 + k/12	-87/176 + l/28
11	2	1	1/33 + k/12	-83/176 + l/28	11	3	-1	2/33 + k/12	-611/1232 + l/28
11	3	2	0/1 + k/12	-607/1232 + l/28	11	3	3	1/132 + k/12	-615/1232 + l/28
11	4	-4	1/132 + k/12	-611/1232 + l/28	11	4	2	0/1 + k/12	-579/1232 + l/28
11	4	5	5/132 + k/12	-591/1232 + l/28	11	5	-5	3/44 + k/12	-607/1232 + l/28
11	5	-1	7/132 + k/12	-591/1232 + l/28	11	5	4	5/66 + k/12	-579/1232 + l/28
13	-6	-6	3/52 + k/12	-181/364 + l/28	13	-6	-5	1/52 + k/12	-173/364 + l/28
13	-6	-2	11/156 + k/12	-179/364 + l/28	13	-6	0	1/13 + k/12	-13/28 + l/28
13	-5	-3	5/78 + k/12	-85/182 + l/28	13	-5	-1	1/26 + k/12	-43/91 + l/28
13	-5	0	1/39 + k/12	-1/2 + l/28	13	-5	4	3/52 + k/12	-89/182 + l/28
13	-4	0	5/156 + k/12	-27/56 + l/28	13	-4	2	0/1 + k/12	-355/728 + l/28
13	-4	5	1/13 + k/12	-363/728 + l/28	13	-4	6	1/52 + k/12	-361/728 + l/28
13	-3	-6	5/156 + k/12	-347/728 + l/28	13	-3	-5	1/26 + k/12	-341/728 + l/28
13	-3	-2	3/52 + k/12	-339/728 + l/28	13	-3	0	11/156 + k/12	-27/56 + l/28
13	-2	0	5/78 + k/12	-1/2 + l/28	13	-2	2	0/1 + k/12	-173/364 + l/28
13	-2	5	11/156 + k/12	-181/364 + l/28	13	-2	6	1/26 + k/12	-179/364 + l/28
13	-1	-4	2/39 + k/12	-363/728 + l/28	13	-1	0	7/156 + k/12	-27/56 + l/28
13	-1	1	5/78 + k/12	-355/728 + l/28	13	-1	3	1/52 + k/12	-361/728 + l/28
13	1	-4	5/156 + k/12	-339/728 + l/28	13	1	0	1/26 + k/12	-27/56 + l/28
13	1	1	1/52 + k/12	-347/728 + l/28	13	1	3	5/78 + k/12	-341/728 + l/28
13	2	0	1/52 + k/12	-1/2 + l/28	13	2	2	0/1 + k/12	-89/182 + l/28
13	2	5	1/78 + k/12	-85/182 + l/28	13	2	6	7/156 + k/12	-43/91 + l/28
13	3	-6	2/39 + k/12	-355/728 + l/28	13	3	-5	7/156 + k/12	-361/728 + l/28
13	3	-2	1/39 + k/12	-363/728 + l/28	13	3	0	1/78 + k/12	-27/56 + l/28
13	4	0	2/39 + k/12	-27/56 + l/28	13	4	2	0/1 + k/12	-347/728 + l/28
13	4	5	1/156 + k/12	-339/728 + l/28	13	4	6	5/78 + k/12	-341/728 + l/28
13	5	-3	1/52 + k/12	-181/364 + l/28	13	5	-1	7/156 + k/12	-179/364 + l/28
13	5	0	3/52 + k/12	-13/28 + l/28	13	5	4	1/39 + k/12	-173/364 + l/28
13	6	-6	1/39 + k/12	-85/182 + l/28	13	6	-5	5/78 + k/12	-89/182 + l/28
13	6	-2	1/78 + k/12	-43/91 + l/28	13	6	0	1/156 + k/12	-1/2 + l/28
15	-7	-3	7/36 + k/4	-267/560 + l/28	15	-4	3	11/45 + k/4	-261/560 + l/28
15	-2	-3	1/18 + k/4	-277/560 + l/28	15	-1	3	13/90 + k/4	-269/560 + l/28
15	1	3	19/180 + k/4	-271/560 + l/28	15	2	-3	7/36 + k/4	-263/560 + l/28
15	4	3	1/180 + k/4	-279/560 + l/28	15	7	-3	1/18 + k/4	-39/80 + l/28

5.3. Appendix C. Tables 5–7 list homeomorphism classes of Eschenburg-Kruggel spaces with the rank of the fourth integral cohomology group equal to |r|=1,3,5 respectively. Each smooth structure in each such homeomorphism class is represented by an Eschenburg-Kruggel space; these tables list the 'smallest' representatives.

Table 5: Smallest Eschenburg-Kruggel spaces with  $|r|=1,\;s_2\geq 0.$ 

home		ism cl	ass of I		on a arg-Kruggel spaces $s_1, s_2 = 0/1$	home		ism cl	ass of I		on a $arg-Kruggel spaces$ , $s_2 = 1/12$
sum	$k_0$	$k_1$	$l_0$	$l_1$	$s_1$	sum	$k_0$	$k_1$	$l_0$	$l_1$	, s <sub>2</sub> = 1/12
0	-17	5	-14	-2	-1/2	1	-26	6	-23	-1	-1/2
0	-24	6	-13	-12	-13/28	-2	10	8	9	9	-13/28
0	-47	11	-38	-8	-3/7	1	-14	5	-7	-7	-3/7
0	-7	3	-6	0	-11/28	1	-21	-3	-19	-6	-11/28
0	-17	5	-16	2	-5/14	1	-11	4	-9	-1	-5/14
0	-36	18	-29	-4	-9/28	1	-29	9	-22	-6	-9/28
0	-27	-1	-24	-6	-2/7	1	-38	2	-33	-7	-2/7
0	7	5	6	6	-1/4	1	-30	10	-19	-11	-1/4
0	-41	-3	-38	-8	-3/14	1	-13	-1	-11	-4	-3/14
0	-12	-1	-10	-4	-5/28	1	-6	2	-3	-3	-5/28
0	-17	-4	-14	-8	-1/7	1	-14	-3	-11	-7	-1/7
0	-11	-9	-10	-10	-3/28	1	-13	5	-10	-2	-3/28
0	-24	6	-23	3	-1/14	1	-34	-2	-25	-15	-1/14
0	3	1	2	2	-1/28	1	-17	-1	-12	-8	-1/28
0	-4	1	-2	-2	0/1	1	-43	19	-42	13	0/1
0	-3	-1	-2	-2	1/28	1	-17	-5	-12	-11	1/28
0	-20	-3	-18	-6	1/14	1	-11	-2	-7	-7	1/14
0	11	9	10	10	3/28	1	-10	5	-9	1	3/28
0	-22	8	-21	4	1/7	1	-27	8	-21	-5	1/7
0	-14	4	-13	1	5/28	1	-42	14	-27	-15	5/28
0	-46	8	-44	3	3/14	1	-21	11	-20	5	3/14
0	-7	-5	-6	-6	1/4	1	-3	-1	-2	-2	1/4
0	-30	6	-28	1	2/7	1	-17	5	-11	-6	2/7
0	-33	4	-18	-18	9/28	1	-43	5	-34	-11	9/28
0	-14	-2	-12	-5	5/14	1	-20	0	-17	-5	5/14
0	-6	0	-4	-3	11/28	-2	2	0	1	1	11/28
0	-46	8	-36	-11	3/7	1	-5	3	-4	0	3/7
0	-25	12	-18	-6	13/28	1	-13	7	-11	0	13/28

Table 5, continued from previous page

home	omorph			ctures o	on a irg-Kruggel space	s home	omorph		tructures of	on a irg-Kruggel spaces
sum					$s, s_2 = 1/6$			r  = 1, s =		
-1	26	-8	17	9	-13/2		-22	-6 -i		-1/2
-1	30	-11	17	13	-13/2 $-3/$		-22 $-50$		$\frac{19}{38} - \frac{10}{18}$	-13/28
-1	17	-7	16	-3	-11/2		-48	-4 -4		-3/7
$-1 \\ -1$	14 49	$\frac{12}{-7}$	13 40	13 10	-5/1 $-9/2$		$-20 \\ -9$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	$-11/28 \\ -5/14$
-1	26	24	25	25	-2/	7 0	-22	6 -	18 -3	-9/28
$-1 \\ -1$	13 21	$-7 \\ -4$	12 13	$-2\\9$	-1/- $-3/1$		$-19 \\ 2$	5 —	$ \begin{array}{ccc} 16 & -2 \\ 1 & 1 \end{array} $	$-2/7 \\ -1/4$
-1	17	-3	10	8	-5/2	8 0	-39	6 -:	-20	-3/14
-1	33	-7	29	2	-1/		-62	30 -		-5/28
$-1 \\ -1$	$\frac{32}{21}$	$-14 \\ -2$	29 17	$-3 \\ 5$	$-3/2 \\ -1/1$		$-20 \\ -4$	$\begin{array}{ccc} 0 & -1 \\ -2 & -1 \end{array}$	$     \begin{array}{rrr}       17 & -5 \\       -3 & -3     \end{array} $	$-1/7 \\ -3/28$
-1	46	-11	41	1	-1/2	3 0	-48	22 -	35 -11	-1/14
$-1 \\ -1$	$\frac{2}{24}$	-3	1 13	1 13	0/ 1/2		$-20 \\ -28$	0 - 10 -:	$ \begin{array}{ccc} 13 & -10 \\ 27 & 6 \end{array} $	$-1/28 \\ 0/1$
-1	21	-7	13	8	1/1		6	4	5 5	1/28
-1	10	-3	5	5	3/2		-14		$\frac{11}{10}$ $-2$	1/14
$^{2}_{-1}$	$-15 \\ 9$	$-13 \\ -3$	$-14 \\ 5$	$-14 \\ 4$	1/ 5/2		-19 $-15$	5 – 6 –	18 2 14 2	$\frac{3/28}{1/7}$
2	-3	-1	-2	-2	3/1	1 0	-49	11 -		5/28
$-1 \\ 2$	$\frac{30}{-7}$	$-11 \\ -5$	$^{29}_{-6}$	$-7 \\ -6$	1/ 2/		$-41 \\ -26$		$     \begin{array}{ccc}       28 & -12 \\       23 & 1     \end{array} $	$\frac{3/14}{1/4}$
-1	29	1	18	16	9/2		-28	6 -:		$\frac{1}{4}$ $\frac{1}{4}$ $\frac{1}{7}$
-1	6	4	5	5	5/1		-48	-10 -:		9/28
$-1 \\ -1$	$\frac{45}{14}$	-4	29 9	26 5	11/2 3/		$-48 \\ -43$	16	45 6 42 10	5/14 11/28
-1	52	5	41	21	13/2	3 0	-10	-1 -	-8 -4	3/7
2	-11	-9	-10	-10	1/	2 0	10	8	9 9	13/28
		Smoo	oth stru	ctures o	on a			Smooth s	tructures	on a
home		ism cla	ass of E	schenbu	ırg-Kruggel space	s home		nism class o	f Eschenbu	ırg-Kruggel spaces
home		ism cla	ass of E	schenbu					f Eschenbu	ırg-Kruggel spaces
sum 1	with k <sub>0</sub> -19		ass of Early, $s = 0$ , $l_0$	schenbu $p_1 = 0$ $l_1$	$s_2 = 1/3$ $s_2 = 1/3$ $s_3 = 1/3$	sum 2 -1	with $k_0$	nism class o $  r  = 1, s = k_1  l_0 $ $-5  12$	f Eschenbu $0, p_1 = 0$ $l_1$ $12$	$\frac{\text{srg-Kruggel spaces}}{s_2 = 5/12}$ $\frac{s_1}{-13/28}$
sum 1 1	with $k_0$ $-19$ $-19$		ass of Ea, $s = 0$ , $l_0$ $-16$ $-18$	schenburg $p_1 = 0$ $l_1$ $-1$ $4$	arg-Kruggel space $s_1, s_2 = 1/3$ $\frac{s}{-1/-13/2}$	sum 2 -1 3 -1	with k <sub>0</sub> 23 44	hism class o $ r  = 1$ , $s = \frac{k_1}{k_1} \frac{l_0}{l_0}$ $-5  12$ $-17  25$	f Eschenburg $0, p_1 = 0$ $l_1$ $12$ $19$	arg-Kruggel spaces $s_2 = 5/12$ $\begin{array}{c} s_1 \\ \hline -13/28 \\ -3/7 \end{array}$
sum 1	with k <sub>0</sub> -19		ass of Early, $s = 0$ , $l_0$	schenburger schen	$s_2 = 1/3$ $s_2 = 1/3$ $s_3 = 1/3$	sum 2 -1 3 -1 7 -1 8 -1	with $k_0$	nism class o $  r  = 1, s = k_1  l_0 $ $-5  12$	f Eschenbu $0, p_1 = 0$ $l_1$ $12$	$\frac{\text{srg-Kruggel spaces}}{s_2 = 5/12}$ $\frac{s_1}{-13/28}$
sum  1 1 1 1 -2 1	with $k_0$ -19 -19 -17 -1 -8	$ r  = 1$ $k_1$ $7$ $9$ $8$ $-1$ $2$	ass of Ea $s = 0$ , $s = 0$ , $l_0$ -16 -18 -15 0 -5	schenbur $p_1 = 0$ $l_1$ $-1$ $4$ $1$ $0$ $-3$	rg-Kruggel space $s_1$ , $s_2 = 1/3$ $s_3$ $s_4$ $s_4$ $s_5$ $s_5$ $s_6$ $s_7$ $s_8$ $s_8$ $s_8$ $s_8$ $s_8$ $s_8$ $s_9$	sum 2 -1 8 -1 7 -1 8 -1 4 -1	with $k_0$ 23  44  31  7  31	$\begin{array}{c} \text{nism class o} \\  r  = 1, \ s = \\ k_1  l_0 \\ \hline \\ -5  12 \\ -17  25 \\ -7  20 \\ 0  5 \\ -16  25 \end{array}$	f Eschenbu $0, p_1 = 0$ $l_1$ 12 19 12 3 3	rg-Kruggel spaces $s_2 = 5/12$ $s_1$ -13/28 -3/7 -11/28 -5/14 -9/28
sum  1 1 1 1 -2	with $k_0$ -19 -19 -17 1	$ r  = 1$ $k_1$ $7$ $9$ $8$ $-1$	ass of Ea, $s = 0$ , $l_0$ $-16$ $-18$ $-15$ $0$	schenburger schen	rg-Kruggel space $s_1, s_2 = 1/3$ $s_2 = 1/3$ $s_3 = -1/2$ -13/2 -3/2 -11/2 -5/1 -9/2	sum  2	with k <sub>0</sub> 23 44 31 7	hism class o $ r  = 1$ , $s = \frac{k_1}{k_1} \frac{l_0}{l_0}$ $\begin{array}{cccccccccccccccccccccccccccccccccccc$	f Eschenbu $0, p_1 = 0$ $l_1$ 12 19 12 3	rg-Kruggel spaces , $s_2 = 5/12$ $s_1$ $-13/28$ $-3/7$ $-11/28$ $-5/14$
sum  1 1 1 1 -2 1 1 1 1 1 1 1	with $k_0$ -19 -19 -17 -8 -38 -47 -3		ass of Ea $s = 0$ , $s = 0$ , $l_0$ -16 -18 -15 0 -5 -33 -40 -2	schenburger $p_1 = 0$ $l_1$ $-1$ $4$ $1$ $0$ $-3$ $-3$ $-14$ $-1$	rg-Kruggel space s $s$ $s$ $-1/$	sum 2 -1 3 -1 7 -1 8 -1 4 -1 8 -1 7 -1 4 -1	with $k_0$ 23 44 31 7 31 9 10 23	$\begin{array}{c} \text{nism class o} \\  r  = 1,  s = \\ k_1  l_0 \\ \hline \\ -5  12 \\ -17  25 \\ -7  20 \\ 0  5 \\ -16  25 \\ -5  8 \\ -1  9 \\ -7  15 \\ \end{array}$	f Eschenbu $0$ , $p_1 = 0$ $l_1$ $12$ $19$ $12$ $3$ $3$ $-1$ $1$ $8$	rg-Kruggel spaces $s_2 = 5/12$ $s_1$ -13/28 -3/7 -11/28 -5/14 -9/28 -2/7 -1/4 -3/14
sum  1 1 1 1 -2 1 1 1 1 1 1 1 1	with $k_0$ -19 -17 -17 -8 -38 -47 -3 -14	ism cla  r  = 1 $k_1$ 7 9 8 -1 2 8 -3 1 0	ass of Ea, $s = 0$ , $l_0$ $ \begin{array}{r} -16 \\ -18 \\ -15 \\ 0 \\ -5 \\ -33 \\ -40 \\ -2 \\ -9 \end{array} $	schenburg $p_1 = 0$ $l_1$ $-1$ $4$ $1$ $0$ $-3$ $-3$ $-14$ $-1$ $-7$	rg-Kruggel space $s_1, s_2 = 1/3$	sum  2 -1 3 -1 7 -1 3 -1 4 -1 4 -1 4 -1 4 -1	with $k_0$ 23 44 31 7 31 9 10 23 17	$\begin{array}{l} \text{nism class o} \\  r  = 1, \ s = \\ k_1  l_0 \\ \hline -5  12 \\ -17  25 \\ -7  20 \\ 0  5 \\ -16  25 \\ -5  8 \\ -1  9 \\ -7  15 \\ -9  12 \\ \end{array}$	$\begin{array}{c} \text{f Eschenbu} \\ 0,  p_1 = 0 \\ l_1 \\ \hline \\ 12 \\ 19 \\ 12 \\ 3 \\ 3 \\ -1 \\ 1 \\ 8 \\ 4 \\ \end{array}$	rg-Kruggel spaces $s_2 = 5/12$ $\begin{array}{c} s_1 \\ -13/28 \\ -3/7 \\ -11/28 \\ -5/14 \\ -9/28 \\ -2/7 \\ -1/4 \\ -3/14 \\ -5/28 \end{array}$
sum  1 1 1 -2 1 1 1 1 1 1 1 1 1 1 1 1 1	with $k_0$ -19 -17 -1 -8 -38 -47 -3 -14 -17 -11	ism cla  r  = 1 $\frac{k_1}{k_1}$ 7 9 8 -1 2 8 -3 1 0 9 -1	ass of Each state of Each sta	schenbu $p_1 = 0$ $l_1$ $-1$ $4$ $1$ $0$ $-3$ $-3$ $-14$ $-1$ $-7$ $-1$ $-4$	rg-Kruggel space $s$ , $s_2 = 1/3$ s -1/ -13/2 -3/ -11/2 -5/1 -9/2 -2/ -1/ -3/1 -5/2 -1/	sum  2	with $k_0$ 23  44  31  7  31  9  10  23  17  25  6	$\begin{array}{l} \text{nism class o} \\  r  = 1, \ s = \\ \hline k_1  l_0 \\ \hline -5  12 \\ -7  25 \\ -7  20 \\ 0  5 \\ -16  25 \\ -5  8 \\ -1  9 \\ -7  15 \\ -9  12 \\ -11  22 \\ -1  5 \end{array}$	f Eschenbu $0$ , $p_1 = 0$ $l_1$ $12$ $19$ $12$ $3$ $3$ $-1$ $1$ $8$ $4$ $-1$ $1$	rg-Kruggel spaces $52 = 5/12$ $51$ $-13/28$ $-3/7$ $-11/28$ $-5/14$ $-9/28$ $-2/7$ $-1/4$ $-3/14$ $-5/28$ $-1/7$ $-3/28$
sum  1 1 1 -2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	with $k_0$ -19 -17 -1 -8 -38 -47 -3 -14 -17 -11 -10	$\begin{array}{c} \text{ism cla} \\  r  = 1 \\ \hline k_1 \\ \hline \\ 7 \\ 9 \\ 8 \\ -1 \\ 2 \\ 8 \\ -3 \\ 1 \\ 0 \\ 9 \\ -1 \\ -1 \\ \end{array}$	ass of Each state of Each sta	schenbu $p_1 = 0$ $l_1$ $-1$ $4$ $1$ $0$ $-3$ $-3$ $-14$ $-1$ $-7$ $-1$ $-4$ $-5$	rg-Kruggel space $s_1, s_2 = 1/3$ $s_3$ $s_4$ $s_4$ $s_5$ $s_7$	sum  2 -1 3 -1 7 -1 3 -1 4 -1 7 -1 4 -1 7 -1 4 -1 7 -1 7 -1 8 -1 7 -1 8 -1 7 -1 8 -1 8 -1 7 -1	with $k_0$ 23  44  31  7  31  9  10  23  17  25  6  42	$\begin{array}{l} \text{nism class o} \\  r  = 1,  s = \\ k_1  l_0 \\ \hline -5  12 \\ -17  25 \\ -7  20 \\ 0  5 \\ -16  25 \\ -5  8 \\ -1  9 \\ -7  15 \\ -9  12 \\ -11  22 \\ -1  5 \\ -17  21 \\ \end{array}$	f Eschenbu $0$ , $p_1 = 0$ $l_1$ $l_2$ $l_3$ $l_4$ $l_5$ $l_7$ $l_8$ $l_$	rg-Kruggel spaces $s_2 = 5/12$ $-13/28$ $-3/7$ $-11/28$ $-5/14$ $-9/28$ $-2/7$ $-1/4$ $-3/14$ $-5/28$ $-1/7$ $-3/28$ $-1/14$
sum  1 1 1 -2 1 1 1 1 1 1 1 1 1 1 1 1 1	with $k_0$ -19 -17 -1 -8 -38 -47 -3 -14 -17 -11	ism cla  r  = 1 $\frac{k_1}{k_1}$ 7 9 8 -1 2 8 -3 1 0 9 -1	ass of Each state of Each sta	schenbu $p_1 = 0$ $l_1$ $-1$ $4$ $1$ $0$ $-3$ $-3$ $-14$ $-1$ $-7$ $-1$ $-4$	rg-Kruggel space $s$ , $s_2 = 1/3$ s -1/ -13/2 -3/ -11/2 -5/1 -9/2 -2/ -1/ -3/1 -5/2 -1/	sum  2	with $k_0$ 23  44  31  7  31  9  10  23  17  25  6	$\begin{array}{l} \text{nism class o} \\  r  = 1, \ s = \\ \hline k_1  l_0 \\ \hline -5  12 \\ -7  25 \\ -7  20 \\ 0  5 \\ -16  25 \\ -5  8 \\ -1  9 \\ -7  15 \\ -9  12 \\ -11  22 \\ -1  5 \end{array}$	f Eschenbu $0$ , $p_1 = 0$ $l_1$ $12$ $19$ $12$ $3$ $3$ $-1$ $1$ $8$ $4$ $-1$ $1$	rg-Kruggel spaces $52 = 5/12$ $51$ $-13/28$ $-3/7$ $-11/28$ $-5/14$ $-9/28$ $-2/7$ $-1/4$ $-3/14$ $-5/28$ $-1/7$ $-3/28$
sum  1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	with $k_0$ -19 -17 -18 -38 -47 -3 -14 -17 -11 -10 -24 -29 -20	$\begin{array}{c} \text{ism cla} \\  r  = 1 \\ \hline k_1 \\ \hline \\ 7 \\ 9 \\ 8 \\ -1 \\ 2 \\ 8 \\ -3 \\ 1 \\ 0 \\ 9 \\ -1 \\ -1 \\ 13 \\ -2 \\ \end{array}$	ass of Ea, $s = 0$ ,	schenbur $p_1 = 0$ $l_1$ $-1$ $4$ $1$ $0$ $-3$ $-3$ $-14$ $-1$ $-7$ $-1$ $-4$ $-5$ $-11$ $0$ $-9$	rg-Kruggel space $s_1$ , $s_2 = 1/3$ $s_3$ -1/ -13/2 -3/ -11/2 -5/1 -9/2 -2/ -1/ -3/1 -5/2 -1/ -3/2 -1/1 -1/2 0/	sum  2 -1 3 -1 7 -1 3 -1 4 -1 4 -1 4 -1 5 -1 4 -1 5 -1 6 -1 6 -1 7 -1 6 -1 6 -1 7 -1 6 -1 7 -1 7 -1 7 -1 8 -1 8 -1 7 -1 8 -1 8 -1 8 -1	with $k_0$ 23  44  31  7  31  9  10  23  17  25  6  42  5  24  14	$\begin{array}{lll} \text{nism class o} \\  r  = 1,  s = \\ k_1 & l_0 \\ \hline -5 & 12 \\ -17 & 25 \\ -7 & 20 \\ 0 & 5 \\ -16 & 25 \\ -5 & 8 \\ -1 & 9 \\ -7 & 15 \\ -9 & 12 \\ -11 & 22 \\ -11 & 25 \\ -17 & 21 \\ 3 & 4 \\ -9 & 23 \\ -1 & 13 \end{array}$	$\begin{array}{c} \text{f Eschenbu} \\ 0,  p_1 = 0 \\ l_1 \\ \hline 12 \\ 19 \\ 12 \\ 3 \\ -1 \\ 1 \\ 8 \\ 4 \\ -1 \\ 1 \\ 21 \\ 4 \\ -5 \\ 1 \\ \end{array}$	rg-Kruggel spaces $s_2 = 5/12$ $-13/28$ $-3/7$ $-11/28$ $-5/14$ $-9/28$ $-2/7$ $-1/4$ $-3/14$ $-5/28$ $-1/7$ $-3/28$ $-1/14$ $-1/28$ $0/1$ $1/28$
sum  1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	with $k_0$ -19 -19 -17 1 -8 -38 -47 -3 -14 -17 -11 -10 -24 -29 -20 -5	$  r  = 1 \\ k_1 \\ \hline \\ 7 \\ 9 \\ 8 \\ -1 \\ 2 \\ 8 \\ -3 \\ 1 \\ 0 \\ 9 \\ -1 \\ -1 \\ -1 \\ 13 \\ -2 \\ 1 $	ass of E, $s = 0$ , $l_0$ $ \begin{array}{r} -16 \\ -18 \\ -15 \\ 0 \\ -5 \\ -33 \\ -40 \\ -2 \\ -9 \\ -14 \\ -9 \\ -7 \\ -17 \\ -25 \\ -15 \\ -4 \end{array} $	schenbur $p_1 = 0$ $l_1$ $-1$ $4$ $1$ $0$ $-3$ $-3$ $-14$ $-1$ $-7$ $-1$ $-4$ $-5$ $-11$ $0$ $-9$ $-1$	rg-Kruggel space, $s_2 = 1/3$ $\begin{array}{c} s \\ \hline -1/\\ -13/2 \\ -3/\\ -11/2 \\ -5/1 \\ -9/2 \\ -2/\\ -1/\\ -5/2 \\ -1/\\ -3/1 \\ -5/2 \\ -1/1 \\ -1/2 \\ 0/\\ 1/2 \end{array}$	sum  2	with $k_0$ 23  44  31  7  31  9  10  23  17  25  6  42  5  24  14  35	$\begin{array}{ll} \text{nism class o} \\  r  = 1, \ s = \\ k_1 & l_0 \\ \hline -5 & 12 \\ -17 & 25 \\ -7 & 20 \\ 0 & 5 \\ -16 & 25 \\ -16 & 25 \\ -1 & 9 \\ -7 & 15 \\ -9 & 12 \\ -11 & 22 \\ -11 & 22 \\ -11 & 22 \\ -1 & 5 \\ -17 & 21 \\ 3 & 4 \\ -9 & 23 \\ -1 & 13 \\ -15 & 28 \\ \end{array}$	$\begin{array}{c} \text{f Eschenbu} \\ 0, p_1 = 0 \\ \hline l_1 \\ \hline 12 \\ 19 \\ 12 \\ 3 \\ -1 \\ 1 \\ 8 \\ 4 \\ -1 \\ 1 \\ 21 \\ 4 \\ -5 \\ 1 \\ 4 \\ \end{array}$	rg-Kruggel spaces $s_2 = 5/12$ $\begin{array}{c} s_1 \\ -13/28 \\ -3/7 \\ -11/28 \\ -5/14 \\ -9/28 \\ -2/7 \\ -1/4 \\ -3/14 \\ -5/28 \\ -1/7 \\ -3/28 \\ -1/14 \\ -1/28 \\ 0/1 \\ 1/28 \\ 1/14 \end{array}$
sum  1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	with $k_0$ -19 -17 -1 -8 -38 -47 -3 -14 -17 -11 -10 -24 -29 -20 -5 -26 -15	$  r  = 1 \\ k_1 $ $ 7 \\ 9 \\ 8 \\ -1 \\ 2 \\ 8 \\ -3 \\ 1 \\ 0 \\ 9 \\ -1 \\ -1 \\ -1 \\ 13 \\ -2 \\ 1 \\ -4 \\ 5 $	$\begin{array}{c} \text{ass of E}, \ s = 0, \\ \hline l_0 \\ \hline -16 \\ -18 \\ -15 \\ 0 \\ -5 \\ -33 \\ -40 \\ -2 \\ -9 \\ -14 \\ -9 \\ -7 \\ -17 \\ -25 \\ -15 \\ -4 \\ -21 \\ -21 \\ -12 \end{array}$	schenbur $p_1 = 0$ $p_2 = 0$ $p_1 = 0$ $p_2 = 0$ $p_2 = 0$ $p_3 = 0$ $p_4 =$	rg-Kruggel space, $s_2 = 1/3$ $\begin{array}{c} s \\ \hline -1/\\ -13/2 \\ -3/\\ -11/2 \\ -5/1 \\ -9/2 \\ -2/\\ -1/\\ -3/1 \\ -5/2 \\ -1/\\ -1/2 \\ 0/\\ 1/2 \\ 1/1 \\ 1/2 \\ 1/1 \\ 3/2 \end{array}$	sum  2	with $k_0$ 23  44  31  7  31  9  10  23  17  25  6  42  5  24  14  35  15	$\begin{array}{lll} \text{nism class o} \\  r  = 1,  s = \\ k_1 & l_0 \\ \hline -5 & 12 \\ -7 & 25 \\ -7 & 20 \\ 0 & 5 \\ -7 & 25 \\ -7 & 20 \\ 0 & 5 \\ -16 & 25 \\ -5 & 8 \\ -1 & 9 \\ -7 & 15 \\ -9 & 12 \\ -11 & 25 \\ -11 & 25 \\ -17 & 21 \\ 3 & 4 \\ -9 & 23 \\ -1 & 13 \\ -15 & 28 \\ -8 & 11 \\ -1 & 12 \\ \end{array}$	f Eschenbu $0$ , $p_1 = 0$ $l_1$ $l_2$ $l_3$ $l_4$ $l_5$ $l_6$ $l_7$ $l_8$ $l_$	rg-Kruggel spaces $s_2 = 5/12$ $-13/28$ $-3/7$ $-11/28$ $-5/14$ $-9/28$ $-2/7$ $-1/4$ $-3/14$ $-5/28$ $-1/7$ $-3/28$ $-1/14$ $-1/28$ $1/14$ $3/28$ $1/7$
sum  1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	$\begin{array}{c} \text{with} \\ k_0 \\ \hline \\ -19 \\ -17 \\ 1 \\ -8 \\ -38 \\ -47 \\ -3 \\ -34 \\ -17 \\ -11 \\ -10 \\ -24 \\ -29 \\ -20 \\ -5 \\ -26 \\ -15 \\ -30 \\ \end{array}$	$  r  = 1 \\ k_1 $ $ 7$ $ 9$ $ 8$ $ -1$ $ 2$ $ 8$ $ -3$ $ 1$ $ 0$ $ -1$ $ -1$ $ -1$ $ -1$ $ -1$ $ -1$ $ -3$ $ -2$ $ 1$ $ -4$ $ 5$ $ 8$	$\begin{array}{c} \text{ass of E}, \ s = 0, \\ \hline l_0 \\ \hline -16 \\ -18 \\ -15 \\ 0 \\ -5 \\ -33 \\ -40 \\ -2 \\ -9 \\ -14 \\ -9 \\ -17 \\ -17 \\ -25 \\ -15 \\ -4 \\ -21 \\ -29 \\ \end{array}$	schenbu $p_1 = 0$ $l_1$ $l_1$ $l_1$ $l_2$ $l_3$ $l_4$ $l_4$ $l_4$ $l_5$ $l_6$ $l_7$ $l_8$	rg-Kruggel space, $s_2 = 1/3$ $\begin{array}{c} s \\ \hline -1/3 \\ -13/2 \\ -3/4 \\ -11/2 \\ -3/4 \\ -11/2 \\ -5/1 \\ -9/2 \\ -2/4 \\ -1/4 \\ -3/1 \\ -5/2 \\ -1/1 \\ -1/2 \\ 0/0 \\ 1/2 \\ 1/1 \\ 3/2 \\ 1/1 \end{array}$	sum  2	with $k_0$ 23  44  31  7  31  9  10  23  17  25  6  42  5  24  14  35  15  30	$\begin{array}{lll} \text{nism class o} \\  r  = 1,  s = \\ k_1 & l_0 \\ \hline & -5 & 12 \\ -17 & 25 \\ -7 & 20 \\ 0 & 5 \\ -16 & 25 \\ -5 & 8 \\ -1 & 9 \\ -7 & 15 \\ -9 & 12 \\ -11 & 22 \\ -11 & 22 \\ -11 & 24 \\ -9 & 23 \\ -1 & 13 \\ -15 & 28 \\ -8 & 11 \\ -1 & 12 \\ -1 & 17 \\ \end{array}$	f Eschenbu $0$ , $p_1 = 0$ $l_1$ $l_2$ $l_3$ $l_4$ $l_5$ $l_6$ $l_7$ $l_8$ $l_$	rg-Kruggel spaces $s_2 = 5/12$ $-13/28$ $-3/7$ $-11/28$ $-5/14$ $-9/28$ $-2/7$ $-1/4$ $-3/14$ $-5/28$ $-1/7$ $-3/28$ $-1/14$ $-1/28$ $0/1$ $1/28$ $1/14$ $3/28$ $1/7$ $5/28$
sum  1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	with $k_0$ -19 -17 -1 -8 -38 -47 -3 -14 -17 -11 -10 -24 -29 -20 -5 -26 -15	$  r  = 1 \\ k_1 \\ \hline 7 \\ 9 \\ 8 \\ -1 \\ 2 \\ 8 \\ -3 \\ 1 \\ 0 \\ 9 \\ -1 \\ -1 \\ 13 \\ -2 \\ 1 \\ -4 \\ 5 \\ 8 \\ 5 \\ 3 $	$\begin{array}{c} \text{ass of E}, \ s = 0, \\ \hline -16 \\ -18 \\ -15 \\ 0 \\ -5 \\ -33 \\ -40 \\ -2 \\ -9 \\ -14 \\ -9 \\ -7 \\ -17 \\ -25 \\ -15 \\ -4 \\ -21 \\ -29 \\ -9 \\ -6 \end{array}$	schenbur $p_1 = 0$ $p_2 = 0$ $p_1 = 0$ $p_2 = 0$ $p_2 = 0$ $p_3 = 0$ $p_4 =$	rg-Kruggel space, $s_2 = 1/3$ $\begin{array}{c} s \\ \hline -1/\\ -13/2 \\ -3/\\ -11/2 \\ -5/1 \\ -9/2 \\ -2/\\ -1/\\ -3/1 \\ -5/2 \\ -1/\\ -1/2 \\ 0/\\ 1/2 \\ 1/1 \\ 1/2 \\ 1/1 \\ 3/2 \end{array}$	sum  2	with $k_0$ 23  44  31  7  31  9  10  23  17  25  6  42  5  24  14  35  15	$\begin{array}{lll} \text{nism class o} \\  r  = 1,  s = \\ k_1 & l_0 \\ \hline -5 & 12 \\ -7 & 25 \\ -7 & 20 \\ 0 & 5 \\ -7 & 25 \\ -7 & 20 \\ 0 & 5 \\ -16 & 25 \\ -5 & 8 \\ -1 & 9 \\ -7 & 15 \\ -9 & 12 \\ -11 & 25 \\ -11 & 25 \\ -17 & 21 \\ 3 & 4 \\ -9 & 23 \\ -1 & 13 \\ -15 & 28 \\ -8 & 11 \\ -1 & 12 \\ \end{array}$	f Eschenbu $0$ , $p_1 = 0$ $l_1$ $l_2$ $l_3$ $l_4$ $l_5$ $l_6$ $l_7$ $l_8$ $l_$	rg-Kruggel spaces $s_2 = 5/12$ $-13/28$ $-3/7$ $-11/28$ $-5/14$ $-9/28$ $-2/7$ $-1/4$ $-3/14$ $-5/28$ $-1/7$ $-3/28$ $-1/14$ $-1/28$ $1/14$ $3/28$ $1/7$
sum  1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	$\begin{array}{c} \text{with} \\ k_0 \\ \hline \\ -19 \\ -17 \\ 1 \\ -8 \\ -38 \\ -47 \\ -38 \\ -47 \\ -31 \\ -10 \\ -24 \\ -29 \\ -20 \\ -5 \\ -26 \\ -15 \\ -30 \\ -15 \\ -7 \\ -4 \\ \end{array}$	$ \begin{array}{c} \text{ism cla} \\  r  = 1 \\ \hline k_1 \\ \hline \\ 7 \\ 9 \\ 8 \\ -1 \\ 2 \\ 8 \\ -3 \\ 1 \\ 0 \\ 9 \\ -1 \\ -1 \\ -1 \\ -1 \\ 13 \\ -2 \\ 1 \\ -4 \\ 5 \\ 8 \\ 5 \\ 3 \\ -2 \end{array} $	$\begin{array}{c} \text{ass of E}, \ s = 0, \\ \hline -16 \\ -18 \\ -15 \\ 0 \\ -5 \\ -33 \\ -40 \\ -2 \\ -9 \\ -14 \\ -9 \\ -17 \\ -25 \\ -15 \\ -4 \\ -21 \\ -29 \\ -9 \\ -6 \\ -3 \end{array}$	schenbu $p_1 = 0$ $l_1$ $-1$ $l_1$ $0$ $-3$ $-3$ $-14$ $-7$ $-1$ $-4$ $-5$ $-11$ $0$ $-9$ $-1$ $-11$ $-2$ $-5$ $-6$ $0$ $-3$	arg-Kruggel space $s_1, s_2 = 1/3$ $ \begin{array}{r} s \\ \hline -1/2 \\ -13/2 \\ -3/4 \\ -11/2 \\ -5/1 \\ -9/2 \\ -2/4 \\ -1/4 \\ -3/1 \\ -5/2 \\ -1/1 \\ -1/2 \\ 2 \\ -1/1 \\ -1/2 \\ 1/1 \\ 3/2 \\ 1/1 \\ 3/2 \\ 3/1 \\ 3/1 \\ 3/1 \\ 1/1 \end{array} $	sum  2	with $k_0$ 23 44 31 7 31 9 10 23 17 25 6 42 5 24 14 35 15 30 15 4 17	$\begin{array}{lll} \text{nism class o} \\  r  = 1,  s = \\ k_1 & l_0 \\ \hline -5 & 12 \\ -7 & 20 \\ 0 & 5 \\ -7 & 20 \\ 0 & 5 \\ -7 & 20 \\ 0 & 5 \\ -7 & 20 \\ 0 & 5 \\ -16 & 25 \\ -5 & 8 \\ -1 & 9 \\ -7 & 15 \\ -9 & 12 \\ -11 & 22 \\ -11 & 22 \\ -11 & 25 \\ -17 & 21 \\ 3 & 4 \\ -9 & 23 \\ -1 & 13 \\ -15 & 28 \\ -8 & 11 \\ -1 & 12 \\ -1 & 17 \\ -5 & 8 \\ -1 & 3 \\ -5 & 15 \\ \end{array}$	$\begin{array}{l} \text{f Eschenbu} \\ 0,  p_1 = 0 \\ l_1 \\ \hline 12 \\ 19 \\ 12 \\ 3 \\ 3 \\ -1 \\ 1 \\ 8 \\ 4 \\ -1 \\ 1 \\ 21 \\ 4 \\ -5 \\ 1 \\ 4 \\ 3 \\ 4 \\ 17 \\ 7 \\ 1 \\ 0 \\ \end{array}$	rg-Kruggel spaces $s_2 = 5/12$ $-13/28$ $-3/7$ $-11/28$ $-5/14$ $-9/28$ $-2/7$ $-1/4$ $-3/14$ $-5/28$ $-1/7$ $-3/28$ $-1/4$ $-1/28$ $0/1$ $1/28$ $1/4$ $3/28$ $1/4$ $3/28$ $1/7$ $5/28$ $3/14$ $1/4$ $2/7$
sum  1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	$\begin{array}{c} \text{with} \\ k_0 \\ \hline \\ -19 \\ -17 \\ 1 \\ -8 \\ -38 \\ -47 \\ -3 \\ -47 \\ -3 \\ -14 \\ -17 \\ -11 \\ -10 \\ -24 \\ -29 \\ -20 \\ -5 \\ -26 \\ -15 \\ -30 \\ -15 \\ -7 \\ -4 \\ -9 \\ \end{array}$	$  r  = 1 \\ k_1 \\ \hline 7 \\ 9 \\ 8 \\ -1 \\ 2 \\ 8 \\ -3 \\ 1 \\ 0 \\ 9 \\ -1 \\ -1 \\ 13 \\ -2 \\ 1 \\ -4 \\ 5 \\ 8 \\ 5 \\ 3 $	$\begin{array}{c} \text{ass of E}, \ s = 0, \\ \hline 0 \\ \hline -16 \\ -18 \\ -15 \\ 0 \\ -5 \\ -33 \\ -40 \\ -2 \\ -9 \\ -14 \\ -9 \\ -7 \\ -17 \\ -25 \\ -14 \\ -21 \\ -25 \\ -15 \\ -4 \\ -21 \\ -29 \\ -6 \\ -3 \\ -7 \end{array}$	schenbus $p_1 = 0$ $l_1$ $l_1$ $l_1$ $l_2$ $l_3$ $l_4$ $l_4$ $l_4$ $l_5$ $l_6$ $l_7$ $l_8$	rg-Kruggel space, $s_2=1/3$ $\begin{array}{c} s \\ -1/\\ -13/2 \\ -3/\\ -5/1 \\ -9/2 \\ -5/1 \\ -9/2 \\ -2/\\ -1/\\ -3/1 \\ -5/2 \\ -1/\\ -3/2 \\ -1/1 \\ -1/2 \\ 1/2 \\ 1/2 \\ 3/2 \\ 1/1 \\ 5/2 \\ 3/1 \\ 1/2 \\ 2/ \end{array}$	sum  2	with $k_0$ 23  44  31  7  31  9  10  23  17  25  6  42  5  24  14  35  15  15  17  30  17  32	$\begin{array}{l} \text{nism class o} \\  r  = 1,  s = \\ k_1  l_0 \\ \hline \\ k_1  l_0 \\ \hline \\ -5  12 \\ -17  25 \\ -7  20 \\ 0  5 \\ -16  25 \\ -5  8 \\ -1  9 \\ -7  15 \\ -9  12 \\ -11  22 \\ -11  22 \\ -11  3  4 \\ -9  23 \\ -1  13 \\ -15  28 \\ -8  81 \\ -1  12 \\ -1  17 \\ -5  8 \\ -1  3 \\ -5  5  15 \\ -16  27 \\ \end{array}$	f Eschenbu $0$ , $p_1 = 0$ $l_1$ $l_2$ $l_3$ $l_4$ $l_5$ $l_6$ $l_7$ $l_8$ $l_$	rg-Kruggel spaces $3 \cdot 2 = 5/12$ $-13/28$ $-3/7$ $-11/28$ $-5/14$ $-9/28$ $-2/7$ $-1/4$ $-3/14$ $-5/28$ $-1/4$ $-1/28$ $-1/14$ $-1/28$ $0/1$ $1/28$ $1/1$ $1/28$ $1/7$ $5/28$ $3/14$ $1/4$ $2/7$ $9/28$
sum  1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	$\begin{array}{c} \text{with} \\ k_0 \\ \hline \\ -19 \\ -17 \\ 1 \\ -8 \\ -38 \\ -47 \\ -3 \\ -3 \\ -14 \\ -17 \\ -11 \\ -10 \\ -24 \\ -29 \\ -5 \\ -26 \\ -15 \\ -30 \\ -15 \\ -7 \\ -4 \\ -9 \\ -9 \\ -10 \\ \end{array}$	$\begin{aligned} & \text{ism cla} \\ &  r  = 1 \\ & \frac{k_1}{7} \\ & \frac{8}{8} \\ & -1 \\ & \frac{2}{8} \\ & \frac{8}{8} \\ & -3 \\ & \frac{1}{1} \\ & 0 \\ & 9 \\ & -1 \\ & -1 \\ & -1 \\ & -1 \\ & -1 \\ & -1 \\ & -1 \\ & -1 \\ & -1 \\ & \frac{1}{3} \\ & \frac{3}{8} \\ & \frac{3}{8} \\ & \frac{3}{1} \\ & \frac{1}{9} \\ & \frac{1}{9} \\ & \frac{1}{1} \\ & $	$\begin{array}{c} \text{ass of E}, \ s = 0, \\ \hline -16 \\ -18 \\ -15 \\ 0 \\ -5 \\ -33 \\ -40 \\ -2 \\ -9 \\ -14 \\ -9 \\ -17 \\ -17 \\ -25 \\ -15 \\ -4 \\ -21 \\ -29 \\ -9 \\ -6 \\ -3 \\ -7 \\ -9 \end{array}$	schenbu $p_1 = 0$ $l_1$ $p_1 = 0$ $l_1$ $p_1 = 0$ $p_1 = 0$ $p_1 = 0$ $p_1 = 0$ $p_2 = 0$ $p_3 = 0$ $p_4 = 0$ $p_4 = 0$ $p_4 = 0$ $p_5 = 0$ $p_5 = 0$ $p_6 $	arg-Kruggel space $s_1, s_2 = 1/3$ $\begin{array}{c} s \\ \hline -1/\\ -13/2 \\ -3/\\ -11/2 \\ -5/1 \\ -9/2 \\ -2/\\ -1/\\ -3/1 \\ -5/2 \\ -1/\\ -3/2 \\ -1/1 \\ -1/2 \\ 0/0 \\ 1/2 \\ 1/1 \\ 3/2 \\ 2/1 \\ 1/2 \\ 3/1 \\ 1/2 \\ 9/2 \\ 5/1 \end{array}$	sum  2	with $k_0$ 23  44  31  7  31  9  10  23  17  25  6  42  5  24  14  35  15  30  17  32  11  8	$\begin{array}{lll} \text{nism class o} \\  r  = 1,  s = \\ k_1 & l_0 \\ \hline -5 & l_2 \\ -7 & 20 \\ 0 & 5 \\ -7 & 20 \\ 0 & 5 \\ -7 & 20 \\ 0 & 5 \\ -7 & 15 \\ -9 & 12 \\ -11 & 22 \\ -11 & 25 \\ -17 & 21 \\ 3 & 4 \\ -9 & 23 \\ -1 & 13 \\ -15 & 28 \\ -8 & 11 \\ -1 & 17 \\ -5 & 8 \\ -1 & 17 \\ -5 & 8 \\ -1 & 17 \\ -5 & 8 \\ -1 & 17 \\ -5 & 8 \\ -1 & 17 \\ -5 & 8 \\ -1 & 17 \\ -5 & 8 \\ -1 & 17 \\ -5 & 8 \\ -1 & 3 \\ -5 & 15 \\ -16 & 27 \\ -3 & 7 \\ -1 & 7 \\ \end{array}$	$\begin{array}{l} \text{f Eschenbu} \\ 0,  p_1 = 0 \\ l_1 \\ \hline \\ 12 \\ 19 \\ 12 \\ 3 \\ 3 \\ -1 \\ 1 \\ 8 \\ 4 \\ -1 \\ 1 \\ 21 \\ 4 \\ -5 \\ 1 \\ 4 \\ 3 \\ 4 \\ 17 \\ 7 \\ 1 \\ 0 \\ 1 \\ 4 \\ 17 \\ 7 \\ 1 \\ 0 \\ 1 \\ 4 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1$	rg-Kruggel spaces $s_2 = 5/12$ $-13/28$ $-3/7$ $-11/28$ $-5/14$ $-9/28$ $-2/7$ $-1/4$ $-3/14$ $-5/28$ $-1/7$ $-3/28$ $-1/14$ $-1/28$ $0/1$ $1/28$ $1/14$ $3/28$ $1/14$ $3/28$ $1/7$ $5/28$ $3/14$ $1/7$ $5/28$ $3/14$ $1/4$ $2/7$ $9/28$ $5/14$ $11/28$
sum  1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	with $k_0$ -19 -17 -1 -8 -38 -47 -3 -14 -17 -11 -10 -24 -29 -5 -26 -15 -30 -15 -7 -4 -9	$\begin{array}{l} \mathrm{ism} \ \mathrm{cla} \\  r  = 1 \\ k_1 \\ \hline 7 \\ 9 \\ 8 \\ -1 \\ 1 \\ 2 \\ 8 \\ -3 \\ 1 \\ 0 \\ 9 \\ -1 \\ -1 \\ -1 \\ -1 \\ -1 \\ -2 \\ 1 \\ -4 \\ 5 \\ 8 \\ 5 \\ 3 \\ -2 \\ 0 \\ 4 \end{array}$	$\begin{array}{c} \text{ass of E}, \ s = 0, \\ \hline -16 \\ -18 \\ -15 \\ 0 \\ -5 \\ -33 \\ -40 \\ -2 \\ -9 \\ -14 \\ -9 \\ -7 \\ -17 \\ -25 \\ -15 \\ -44 \\ -21 \\ -21 \\ -29 \\ -6 \\ -3 \\ -7 \\ -7 \end{array}$	schenbu $p_1 = 0$ $l_1$ $-1$ $-1$ $4$ $1$ $0$ $0$ $-3$ $-3$ $-14$ $-1$ $-7$ $-1$ $-4$ $-5$ $-11$ $-2$ $-9$ $-1$ $-11$ $-2$ $-6$ $0$ $-3$ $-3$ $-3$	arg-Kruggel space $s_1, s_2 = 1/3$	sum  2	with k <sub>0</sub> 23 44 31 7 31 9 10 23 17 25 6 42 5 24 14 35 15 30 15 4 17 32 11	$\begin{array}{lll} \text{nism class o} \\  r  = 1,  s = \\ k_1 & l_0 \\ \hline -5 & 12 \\ -7 & 25 \\ -7 & 20 \\ 0 & 5 \\ -7 & 25 \\ -7 & 20 \\ 0 & 5 \\ -16 & 25 \\ -5 & 8 \\ -1 & 9 \\ -7 & 15 \\ -9 & 12 \\ -11 & 22 \\ -11 & 25 \\ -17 & 21 \\ 3 & 4 \\ -9 & 23 \\ -1 & 13 \\ -15 & 28 \\ -8 & 11 \\ -1 & 12 \\ -1 & 17 \\ -5 & 8 \\ -1 & 12 \\ -1 & 17 \\ -5 & 8 \\ -1 & 3 \\ -5 & 15 \\ -16 & 27 \\ -3 & 7 \end{array}$	f Eschenbu $0$ , $p_1 = 0$ $l_1$ $l_2$ $l_3$ $l_4$ $l_5$ $l_6$ $l_7$ $l_8$ $l_$	rg-Kruggel spaces $s_2 = 5/12$ $-13/28$ $-3/7$ $-11/28$ $-5/14$ $-9/28$ $-2/7$ $-1/4$ $-5/28$ $-1/7$ $-3/28$ $-1/14$ $-1/28$ $1/14$ $-1/28$ $1/14$ $3/28$ $1/7$ $5/28$ $3/14$ $1/4$ $2/7$ $9/28$ $5/14$

			(	Computed	Kreck-Sto	lz invaria	nts of Es	chenburg	-Kruggel	spaces				
$s_2$							$s_1$							
-1/2	$-1/2 \\ 0/1$	$-13/28 \\ 1/28$	$-3/7 \\ 1/14$	$-11/28 \\ 3/28$	$-5/14 \\ 1/7$	$-9/28 \\ 5/28$	$-2/7 \\ 3/14$	$-1/4 \\ 1/4$	$-3/14 \\ 2/7$	$-5/28 \\ 9/28$	$-1/7 \\ 5/14$	-3/28 $11/28$	$-1/14 \\ 3/7$	-1/28 $13/28$
-5/12	$-1/2 \\ 0/1$	$-13/28 \\ 1/28$	$-3/7 \\ 1/14$	$-11/28 \\ 3/28$	$-5/14 \\ 1/7$	-9/28 $5/28$	$\frac{-2}{7}$ 3/14	$-1/4 \\ 1/4$	$-3/14 \\ 2/7$	-5/28 $9/28$	$-1/7 \\ 5/14$	-3/28 $11/28$	$-1/14 \\ 3/7$	-1/28 $13/28$
-1/3	$-1/2 \\ 0/1$	-13/28 $1/28$	$-3/7 \\ 1/14$	$-11/28 \\ 3/28$	$-5/14 \\ 1/7$	$-9/28 \\ 5/28$	$\frac{-2}{7}$ 3/14	$-1/4 \\ 1/4$	$-3/14 \\ 2/7$	-5/28 $9/28$	$-1/7 \\ 5/14$	-3/28 $11/28$	$-1/14 \\ 3/7$	-1/28 $13/28$
-1/4	$-1/2 \\ 0/1$	-13/28 $1/28$	$-3/7 \\ 1/14$	$-11/28 \ 3/28$	$-5/14 \\ 1/7$	-9/28 $5/28$	$-2/7 \\ 3/14$	$-1/4 \\ 1/4$	$-3/14 \\ 2/7$	-5/28 $9/28$	$-1/7 \\ 5/14$	-3/28 $11/28$	$-1/14 \\ 3/7$	-1/28 $13/28$
-1/6	$-1/2 \\ 0/1$	-13/28 $1/28$	$-3/7 \\ 1/14$	$-11/28 \\ 3/28$	$-5/14 \\ 1/7$	-9/28 $5/28$	$-2/7 \\ 3/14$	$-1/4 \\ 1/4$	-3/14 $2/7$	-5/28 $9/28$	$-1/7 \\ 5/14$	-3/28 $11/28$	$-1/14 \\ 3/7$	-1/28 $13/28$
-1/12	$-1/2 \\ 0/1$	-13/28 $1/28$	$-3/7 \\ 1/14$	$-11/28 \\ 3/28$	$-5/14 \\ 1/7$	-9/28 $5/28$	$-2/7 \\ 3/14$	$-1/4 \\ 1/4$	-3/14 $2/7$	-5/28 $9/28$	$-1/7 \\ 5/14$	-3/28 $11/28$	$-1/14 \\ 3/7$	-1/28 $13/28$
0/1	$-1/2 \\ 0/1$	$-13/28 \\ 1/28$	$-3/7 \\ 1/14$	$-11/28 \\ 3/28$	$-5/14 \\ 1/7$	$-9/28 \\ 5/28$	$\frac{-2}{7}$ 3/14	$-1/4 \\ 1/4$	$-3/14 \\ 2/7$	-5/28 $9/28$	$-1/7 \\ 5/14$	-3/28 $11/28$	$-1/14 \\ 3/7$	-1/28 $13/28$
1/12	-13/28 $1/28$	$-3/7 \\ 1/14$	$-11/28 \\ 3/28$	$-5/14 \\ 1/7$	-9/28 $5/28$	$-2/7 \\ 3/14$	$-1/4 \\ 1/4$	$-3/14 \\ 2/7$	-5/28 $9/28$	$-1/7 \\ 5/14$	-3/28 $11/28$	$-1/14 \\ 3/7$	-1/28 $13/28$	$0/1 \\ 1/2$
1/6	-13/28 $1/28$	$-3/7 \\ 1/14$	$-11/28 \\ 3/28$	$-5/14 \\ 1/7$	-9/28 $5/28$	$-2/7 \\ 3/14$	$-1/4 \\ 1/4$	$-3/14 \\ 2/7$	-5/28 $9/28$	$-1/7 \\ 5/14$	-3/28 $11/28$	$-1/14 \\ 3/7$	-1/28 $13/28$	$0/1 \\ 1/2$
1/4	$-13/28 \\ 1/28$	$-3/7 \\ 1/14$	$-11/28 \\ 3/28$	$-5/14 \\ 1/7$	-9/28 $5/28$	$-2/7 \\ 3/14$	$-1/4 \\ 1/4$	$-3/14 \\ 2/7$	-5/28 $9/28$	$-1/7 \\ 5/14$	-3/28 $11/28$	$-1/14 \\ 3/7$	-1/28 $13/28$	$0/1 \\ 1/2$
1/3	$-13/28 \\ 1/28$	$-3/7 \\ 1/14$	$-11/28 \\ 3/28$	$-5/14 \\ 1/7$	-9/28 $5/28$	$-2/7 \\ 3/14$	$-1/4 \\ 1/4$	$-3/14 \\ 2/7$	-5/28 $9/28$	$-1/7 \\ 5/14$	-3/28 $11/28$	$-1/14 \\ 3/7$	-1/28 $13/28$	$0/1 \\ 1/2$
5/12	$-13/28 \\ 1/28$	$-3/7 \\ 1/14$	$-11/28 \\ 3/28$	$-5/14 \\ 1/7$	$-9/28 \\ 5/28$	$\frac{-2}{7}$ 3/14	$\begin{array}{c} -1/4 \\ 1/4 \end{array}$	$-3/14 \\ 2/7$	$-5/28 \\ 9/28$	$-1/7 \\ 5/14$	-3/28 $11/28$	$-1/14 \\ 3/7$	-1/28 $13/28$	$0/1 \\ 1/2$

Table 2: |r| = 1,  $s \equiv 0$ ,  $p_1 \equiv 0 \mod r$ .

				Co	mputed Kre					es				<u></u>
$s_2$					7	with $ r =3$	$s \equiv -1, p_1 \\ s_1$	$\equiv 0 \bmod r$ .						
	-55/112	-51/112	-47/112	-43/112	-39/112	-5/16	-31/112	-27/112	-23/112	-19/112	-15/112	-11/112	-1/16	-3/112
-5/18	$\frac{-33/112}{1/112}$	$\frac{-31/112}{5/112}$	9/112	$\frac{-43}{112}$	$\frac{-39/112}{17/112}$	$\frac{-3/16}{3/16}$	$\frac{-31/112}{25/112}$	$\frac{-27/112}{29/112}$	$\frac{-23}{112}$	$\frac{-19/112}{37/112}$	$\frac{-13/112}{41/112}$	$\frac{-11/112}{45/112}$	$\frac{-1}{16}$	$\frac{-3}{112}$ 53/112
-1/36	-55/112	-51/112	-47/112	-43/112	-39/112	-5/16	-31/112	-27/112	-23/112	-19/112	-15/112	-11/112	-1/16	-3/112
-1/30	1/112	5/112	9/112	13/112	17/112	3/16	25/112	29/112	33/112	37/112	41/112	45/112	7/16	53/112
2/9	-55/112 $1/112$	-51/112 $5/112$	-47/112 $9/112$	-43/112 $13/112$	-39/112 $17/112$	$-5/16 \\ 3/16$	-31/112 $25/112$	-27/112 $29/112$	-23/112 $33/112$	-19/112 $37/112$	-15/112 $41/112$	-11/112 $45/112$	$-1/16 \\ 7/16$	-3/112 $53/112$
	-55/112	-51/112	-47/112	-43/112	-39/112	-5/16	-31/112	-27/112	-23/112	-19/112	-15/112	-11/112	-1/16	-3/112
17/36	1/112	5/112	9/112	13/112	17/112	3/16	$\frac{31}{112}$	29/112	33/112	37/112	41/112	45/112	7/16	53/112
				Co	mputed Kre	ck-Stolz inv	ariants of E	schenburg-k	ruggel spac	es				
				Co	mputed Kre	eck-Stolz inv with $ r  = 3$			Kruggel spac	ees				
$s_2$				Co					Kruggel spac	ees				
	-53/112	-7/16	-45/112	Co			$3, s \equiv 1, p_1$		Kruggel spac	-17/112	-13/112	-9/112	-5/112	-1/112
$s_2 - 17/36$	3/112	1/16	11/112	-41/112 $15/112$	-37/112 19/112	with $ r  = 3$ $-33/112$ $23/112$	$3, s \equiv 1, p_1$ $s_1$ $-29/112$ $27/112$	$\equiv 0 \mod r$ . $-25/112$ $31/112$	-3/16 $5/16$	-17/112 $39/112$	43/112	47/112	51/112	55/112
	3/112 $-53/112$	$\frac{1}{16}$ $-7/16$	$11/112 \\ -45/112$	-41/112 $15/112$ $-41/112$	-37/112 19/112 -37/112	with $ r  = 33/112$ $-33/112$ $-33/112$	$3, s \equiv 1, p_1 \\ s_1 \\ \hline -29/112 \\ 27/112 \\ -29/112$	$ \equiv 0 \bmod r. $ $ -25/112 $ $ 31/112 $ $ -25/112 $	-3/16 $5/16$ $-3/16$	-17/112 $39/112$ $-17/112$	43/112 - 13/112	47/112 - 9/112	51/112 - 5/112	55/112 $-1/112$
-17/36 $-2/9$	3/112 $-53/112$ $3/112$	1/16 $-7/16$ $1/16$	11/112 $-45/112$ $11/112$	-41/112 $15/112$ $-41/112$ $15/112$	-37/112 19/112 -37/112 19/112	with $ r  = 3$ $-33/112$ $23/112$ $-33/112$ $23/112$	$3, s \equiv 1, p_1$ $s_1$ $-29/112$ $27/112$ $-29/112$ $27/112$	$\equiv 0 \mod r.$ $-25/112$ $31/112$ $-25/112$ $31/112$	-3/16 $5/16$ $-3/16$ $5/16$	-17/112 $39/112$ $-17/112$ $39/112$	$43/112 \\ -13/112 \\ 43/112$	47/112 $-9/112$ $47/112$	51/112 $-5/112$ $51/112$	55/112 $-1/112$ $55/112$
-17/36	3/112 $-53/112$	$\frac{1}{16}$ $-7/16$	$11/112 \\ -45/112$	-41/112 $15/112$ $-41/112$	-37/112 19/112 -37/112	with $ r  = 33/112$ $-33/112$ $-33/112$	$3, s \equiv 1, p_1 \\ s_1 \\ \hline -29/112 \\ 27/112 \\ -29/112$	$ \equiv 0 \bmod r. $ $ -25/112 $ $ 31/112 $ $ -25/112 $	-3/16 $5/16$ $-3/16$	-17/112 $39/112$ $-17/112$	43/112 - 13/112	47/112 - 9/112	51/112 - 5/112	55/112 $-1/112$
-17/36 $-2/9$	3/112 $-53/112$ $3/112$ $-53/112$	1/16 $-7/16$ $1/16$ $-7/16$	11/112 $-45/112$ $11/112$ $-45/112$	$-41/112 \\ 15/112 \\ -41/112 \\ 15/112 \\ -41/112$	-37/112 19/112 -37/112 19/112 -37/112	with $ r  = 3$ $-33/112$ $23/112$ $-33/112$ $23/112$ $-33/112$	$3, s \equiv 1, p_1$ $-29/112$ $27/112$ $-29/112$ $27/112$ $-29/112$ $-29/112$	$\equiv 0 \mod r.$ $-25/112$ $31/112$ $-25/112$ $31/112$ $-25/112$	-3/16 5/16 -3/16 5/16 -3/16	-17/112 39/112 -17/112 39/112 -17/112	43/112  -13/112  43/112  -13/112	47/112 $-9/112$ $47/112$ $-9/112$	51/112 $-5/112$ $51/112$ $51/112$ $-5/112$	55/112 $-1/112$ $55/112$ $-1/112$

Table 3: |r| = 3,  $s \equiv \pm 1$ ,  $p_1 \equiv 0 \mod r$ .

Table 6: Smallest Eschenburg-Kruggel spaces with  $|r|=3,\,s_2\geq 0.$ 

		_									
homo	omorphic		h structi		a -Kruggel spaces	homo	om ornhi		structi		a -Kruggel spaces
nome					$s_2 = 2/9$						$_{2} = 17/36$
$_{\mathrm{sum}}$	$k_0$	$k_1$	$l_0$	$l_1$	$s_1$	$_{\mathrm{sum}}$	$k_0$	$k_1$	$i_0$	$l_1$	$s_1$
0	-165	60	-152	16	-55/112	0	-2	1	0	0	-55/112
0	-129	45	-128	40	-51/112	0	-66	12	-41	-29	-51/112
0	-63	-36	-56	-44	-47/112	0	-89	19	-84	6	-47/112
0	-51	15	-32	-20	-43/112	0	-29	7	-18	-12	-43/112
0	-132	27	-128	16	-39/112	0	-35	-11	-24	-24	-39/112
0	$-164 \\ -36$	$-20 \\ -15$	$-156 \\ -32$	$-33 \\ -20$	$-5/16 \\ -31/112$	0	$-50 \\ -6$	7 0	$-30 \\ -5$	$-24 \\ -2$	$-5/16 \\ -31/112$
0	-68	16	-60	-3	-37/112 $-27/112$	0	-42	12	-26	-17	-37/112 $-27/112$
Ö	-39	12	-20	-20	-23/112	ő	-30	12	-29	7	-23/112
0	-156	45	-92	-68	-19/112	0	-54	24	-50	7	-19/112
0	-104	-20	-81	-51	-15/112	0	-30	0	-29	-2	-15/112
0	-164	52	-108	-57	-11/112	0	-174	60	-170	43	-11/112
0	$-132 \\ -81$	51 36	$-104 \\ -80$	$-20 \\ 28$	$-1/16 \\ -3/112$	0	$-24 \\ -66$	0 6	$-23 \\ -53$	$^{-2}_{-17}$	-1/16 - 3/112
0	-31 -12	-3	_8	-8	$\frac{-3/112}{1/112}$	0	-42	0	-33 -41	-2	$\frac{-3/112}{1/112}$
0	-60	-27	-56	-32	5/112	0	-54	18	-29	-26	5/112
0	-177	36	-164	4	9/112	0	-41	-2	-30	-18	9/112
0	-60	15	-56	4	13/112	0	-36	-18	-29	-26	13/112
0	-57	21	-56	16	17/112	0	-90	42	-77	-2	17/112
0	$-92 \\ -84$	40 9	$-75 \\ -68$	$-9 \\ -20$	$\frac{3/16}{25/112}$	0	$-114 \\ -36$	$-12 \\ 0$	$-74 \\ -35$	$-65 \\ -2$	$\frac{3/16}{25/112}$
0	-56	16	-36	$-20 \\ -21$	29/112	0	-30	-12	-26	-17	29/112
ő	-75	-9	-68	-20	33/112	ő	-72	6	-50	-29	33/112
0	-33	-3	-20	-20	37/112	0	-48	18	-41	-2	37/112
0	-21	9	-20	4	41/112	0	-12	0	-11	-2	41/112
0	-15	3	-8	-8	45/112	0	-65	19	-42	-24	45/112
0	$-84 \\ -129$	33 36	$-80 \\ -104$	$^{16}_{-20}$	7/16	0	-18 $-114$	0 30	$-17 \\ -65$	$-2 \\ -53$	7/16
	-129	30	-104	-20	53/112	U	-114	30	-65	-55	53/112
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sum	with $ r $ $k_0$	$\lim_{k \to \infty} \frac{1}{k_1}$	s of Esch s = 1, $p_1$ $l_0$	henburg- $l_1 = 0, s_2$ $l_1$	-Kruggel spaces $_2 = 1/36$ $_{s_1}$	sum	with  r	sm class  =3, s	of Esch = 1, $p_1$	= 0, s	-Kruggel spaces $_2 = 5/18$ $_{s_1}$
	with $ r $	= 3, s	s of Esch s = 1, $p_1$	henburg- $_1 = 0, s_2$	-Kruggel spaces $2 = 1/36$		with $ r $ $k_0$	sm class  =3, s $k_1$	s of Esch $l = 1, p_1$ $l_0$	nenburg $= 0, s_1$	-Kruggel spaces 2 = 5/18
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0 0 0 0	with $ r  k_0$ $-54$ $-36$ $-130$ $-54$	sm class $ =3, s]$ $k_1$ $0$ $6$ $47$ $6$	s of Esch $s = 1, p_1$ $l_0$ -37 -25 -114 -34	henburg- $l_1 = 0, s_2$ $l_1$ -25 -13 0 -25	-Kruggel spaces $s_2 = 1/36$ $s_1$ $s_1$ $-53/112$ $-7/16$ $-45/112$ $-41/112$	0 0 0 0 0	with $ r $ $k_0$ $-76$ $-4$ $-22$ $-52$	sm class $k_1$ = 3, $k_2$ = $k_3$ = $k_4$ =	s of Esch $= 1, p_1$ $l_0$ -72 -3 -15 -48	nenburg = 0, $s_1$ $l_1$ $l_2$ $l_3$ $l_4$ $l_5$ $l_6$ $l_6$ $l_7$ $l_8$	-Kruggel spaces $_2 = 5/18$ $s_1$ $-53/112$ $-7/16$ $-45/112$ $-41/112$
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0 0 0 0 0 0	with $ r $ $k_0$ $-54$ $-36$ $-130$ $-54$ $-10$ $-78$	$ \begin{array}{c} \text{sm class} \\   = 3, s \\ k_1 \end{array} $ $ \begin{array}{c} 0 \\ 6 \\ 47 \\ 6 \\ -1 \\ 30 \end{array} $	s of Esch s = 1, $p_1$ $l_0$ -37 -25 -114 -34 -6 -73	henburg- $l = 0, s_2$ $l_1$ -25 -13 0 -25 -6 11	-Kruggel spaces $_2=1/36$ $\begin{array}{r} s_1 \\ \hline -53/112 \\ -45/112 \\ -41/112 \\ -37/112 \\ -33/112 \\ \end{array}$	0 0 0 0 0 0	with $ r $ $k_0$ -76  -4  -22  -52  -46  -93	sm class $k_1 = 3, s$ $k_1 = 34$ $-34$ $2$ $2$ $14$ $8$ $45$	$\begin{array}{c} \text{s of Esch} \\ = 1, \ p_1 \\ l_0 \\ \hline \\ -72 \\ -3 \\ -15 \\ -48 \\ -33 \\ -58 \\ \end{array}$	nenburg = 0, $s_1$	-Kruggel spaces $_2 = 5/18$ $\begin{array}{r} s_1 \\ \hline -53/112 \\ -7/16 \\ -45/112 \\ -41/112 \\ -37/112 \\ -33/112 \end{array}$
0 0 0 0 0 0 0	with $r$ $k_0$ $-54$ $-36$ $-130$ $-54$ $-10$ $-78$ $-37$	$\begin{array}{c} \text{sm class} \\  =3, s \\ \hline k_1 \\ \hline \\ 0 \\ 6 \\ 47 \\ 6 \\ -1 \\ 30 \\ -1 \\ \end{array}$	$\begin{array}{c} \text{s of Esch} \\ \text{s} = 1, \ p_1 \\ l_0 \\ \hline \\ -37 \\ -25 \\ -114 \\ -34 \\ -6 \\ -73 \\ -30 \\ \end{array}$	henburg- $l = 0, s_2$ $l_1$ -25 -13 0 -25 -6 11 -12	$\begin{array}{c} \text{-Kruggel spaces} \\ 2 = 1/36 \\ \hline \\ -53/112 \\ -7/16 \\ -45/112 \\ -41/112 \\ -37/112 \\ -33/112 \\ -29/112 \\ \end{array}$	sum 0 0 0 0 0 0 0	with $r$ $k_0$ $-76$ $-4$ $-22$ $-52$ $-46$ $-93$ $-24$	sm class $ x  = 3, s$ $ x  = 3$	$\begin{array}{c} \text{s of Esch} \\ = 1, \ p_1 \\ l_0 \\ \hline \\ -72 \\ -3 \\ -15 \\ -48 \\ -33 \\ -58 \\ -22 \\ \end{array}$	nenburg = 0, s $l_1$	$ \begin{array}{l} \text{-Kruggel spaces} \\ 2 = 5/18 \\ \hline \\ -53/112 \\ -7/16 \\ -45/112 \\ -41/112 \\ -37/112 \\ -33/112 \\ -29/112 \\ \end{array} $
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sum 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	with $ r $ $k_0$ -54  -36  -130  -54  -10  -78  -37  -30  -60  -34	$\begin{array}{c} \text{sm class} \\  =3, \epsilon \\ k_1 \\ \hline \\ 0 \\ 6 \\ 47 \\ 6 \\ -1 \\ 30 \\ -1 \\ -6 \\ -12 \\ 11 \\ \end{array}$	$\begin{array}{c} \text{s of Esch} \\ \text{s} = 1, \ p_1 \\ l_0 \\ \hline \\ -37 \\ -25 \\ -114 \\ -34 \\ -6 \\ -73 \\ -30 \\ -25 \\ -43 \\ -30 \\ \end{array}$	henburg- $l = 0, s_2$ $l_1$ -25 -13 0 -25 -6 11 -12 -13 -34 0	-Kruggel spaces $_2=1/36$ $\begin{array}{r} s_1 \\ \hline -53/112 \\ -7/16 \\ -45/112 \\ -41/112 \\ -37/112 \\ -33/112 \\ -29/112 \\ -25/112 \\ -3/16 \\ -17/112 \\ \end{array}$	sum 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	with $r$ $k_0$ $-76$ $-4$ $-22$ $-52$ $-46$ $-93$ $-24$ $-39$ $-75$ $-72$	sm class $ s  = 3$ , $s$ $ s  = 3$ ,	$\begin{array}{c} \text{s of Esch} \\ = 1, \ p_1 \\ l_0 \\ \hline \\ -72 \\ -3 \\ -15 \\ -48 \\ -33 \\ -58 \\ -22 \\ -22 \\ -22 \\ -70 \\ \end{array}$	nenburg = 0, s: $l_1$ -39 0 -9 3 -15 -34 2 -10 -22 20	$\begin{array}{c} \text{-Kruggel spaces} \\ 2=5/18 \\ \hline \\ -53/112 \\ -7/16 \\ -45/112 \\ -41/112 \\ -37/112 \\ -33/112 \\ -29/112 \\ -25/112 \\ -3/16 \\ -17/112 \\ \end{array}$
sum 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	with $ r $ $k_0$ -54 -36 -130 -54 -10 -78 -37 -30 -60 -34 -36	$\begin{array}{c} \text{sm class} \\  =3,s \\ k_1 \\ \hline \\ 0 \\ 6 \\ 47 \\ 6 \\ -1 \\ 30 \\ -1 \\ -6 \\ -12 \\ 11 \\ 18 \\ \end{array}$	$\begin{array}{c} \text{s of Esch} \\ \text{s} = 1, \ p_1 \\ l_0 \\ \hline \\ -37 \\ -25 \\ -114 \\ -34 \\ -6 \\ -73 \\ -30 \\ -25 \\ -43 \\ -30 \\ -25 \end{array}$	henburg- $l_1 = 0, s_2$ $l_1$ -25 -13 0 -25 -6 11 -12 -13 -34 0 -10	$\begin{array}{c} \text{-Kruggel spaces} \\ 2 = 1/36 \\ \hline \\ 81 \\ \hline \\ -53/112 \\ -7/16 \\ -45/112 \\ -41/112 \\ -37/112 \\ -33/112 \\ -29/112 \\ -25/112 \\ -3/16 \\ -17/112 \\ -13/112 \\ \end{array}$	sum 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	with $  r k_0  $ -76  -4  -22  -52  -46  -93  -24  -39  -75  -72  -34	$\begin{array}{c} \text{sm class} \\ \text{sm class} \\ \text{sm class} \\ \text{l} \\ = 3, \ s \\ k_1 \\ \\ -34 \\ 2 \\ 2 \\ 14 \\ 8 \\ 45 \\ 9 \\ 15 \\ 27 \\ 33 \\ -16 \\ \end{array}$	$\begin{array}{c} \text{s of Esch} \\ = 1, \ p_1 \\ l_0 \\ \hline \\ -72 \\ -3 \\ -15 \\ -48 \\ -33 \\ -58 \\ -22 \\ -28 \\ -52 \\ -70 \\ -27 \\ \end{array}$	nenburg = 0, s: $l_1$ $-39$ $0$ $-9$ $3$ $-15$ $-34$ $2$ $-10$ $-22$ $20$ $-24$	
sum 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	with $ r $ $k_0$ -54 -36 -130 -54 -10 -78 -37 -30 -60 -34 -36 -42	$\begin{array}{c} \text{sm class} \\  =3, s \\ k_1 \\ \hline \\ 0 \\ 6 \\ 47 \\ 6 \\ -1 \\ 30 \\ -1 \\ -6 \\ -12 \\ 11 \\ 18 \\ 0 \\ \end{array}$	$\begin{array}{c} \text{s of Esch} \\ \text{s} = 1, \ p_1 \\ l_0 \\ \hline \\ -37 \\ -25 \\ -114 \\ -34 \\ -30 \\ -25 \\ -43 \\ -30 \\ -25 \\ -43 \\ -30 \\ -25 \\ -34 \\ \end{array}$	henburg- henburg- $l_1 = 0, s_2$ $l_1$ -25 -13 0 -25 -6 11 -12 -13 -34 0 -10 -13	$\begin{array}{c} \text{-Kruggel spaces} \\ 2 = 1/36 \\ \hline \\ & -53/112 \\ -7/16 \\ -45/112 \\ -41/112 \\ -37/112 \\ -37/112 \\ -29/112 \\ -25/112 \\ -25/112 \\ -3/16 \\ -17/112 \\ -13/112 \\ -9/112 \\ \end{array}$	0 0 0 0 0 0 0 0 0 0 0 0	with $ r $ $k_0$ -76 $-4$ $-22$ $-52$ $-46$ $-93$ $-24$ $-39$ $-75$ $-72$ $-34$ $-51$	$\begin{array}{c} \text{sm class} \\   = 3, s \\   = 3, s \\   = 3 \end{array}$ $\begin{array}{c} -34 \\ 2 \\ 2 \\ 14 \\ 8 \\ 45 \\ 9 \\ 15 \\ 27 \\ 33 \\ -16 \\ 24 \end{array}$	$\begin{array}{c} \text{s of Esch} \\ = 1, \ p_1 \\ l_0 \\ \hline \\ -72 \\ -3 \\ -15 \\ -48 \\ -33 \\ -58 \\ -22 \\ -28 \\ -52 \\ -70 \\ -27 \\ -34 \\ \end{array}$	nenburg = 0, s: $l_1$ $-39$ $0$ $-9$ $3$ $-15$ $-34$ $2$ $-10$ $-22$ $20$ $-24$ $-16$	$\begin{array}{c} \text{-Kruggel spaces} \\ 2=5/18 \\ \hline \\ & \begin{array}{c} s_1 \\ \hline \\ -7/16 \\ -45/112 \\ -41/112 \\ -37/112 \\ -33/112 \\ -29/112 \\ -25/112 \\ -3/16 \\ -17/112 \\ -13/112 \\ -9/112 \\ \end{array}$
sum 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	with $ r $ $k_0$ -54 -130 -54 -10 -78 -37 -30 -60 -34 -36 -42 -106	$\begin{array}{c} \text{sm class} \\  =3,s \\  =3,s \\ k_1 \end{array}$ $\begin{array}{c} 0 \\ 6 \\ 47 \\ 6 \\ -1 \\ 30 \\ -1 \\ -6 \\ -12 \\ 11 \\ 18 \\ 0 \\ 35 \end{array}$	$\begin{array}{c} \text{s of Esch} \\ \text{s} = 1, \ p_1 \\ l_0 \\ \hline \\ -37 \\ -25 \\ -114 \\ -34 \\ -6 \\ -73 \\ -30 \\ -25 \\ -43 \\ -30 \\ -25 \\ -34 \\ -54 \\ \end{array}$	henburgh he	$\begin{array}{c} \text{-Kruggel spaces} \\ 2 = 1/36 \\ \hline \\ -53/112 \\ -7/16 \\ -45/112 \\ -41/112 \\ -37/112 \\ -33/112 \\ -29/112 \\ -25/112 \\ -3/16 \\ -17/112 \\ -13/112 \\ -9/112 \\ -5/112 \\ \end{array}$	sum 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	$\begin{array}{c} \text{with }   r \\ k_0 \\ \hline \\ -76 \\ -4 \\ -22 \\ -52 \\ -46 \\ -93 \\ -24 \\ -39 \\ -75 \\ -72 \\ -34 \\ -51 \\ -21 \\ \end{array}$	sm class $ \cdot  = 3$ , $s$ $k_1$ -34 2 2 14 8 45 9 15 27 33 -16 24 -3	$\begin{array}{c} \text{s of Esch} \\ = 1, \ p_1 \\ l_0 \\ \hline \\ -72 \\ -3 \\ -15 \\ -48 \\ -33 \\ -58 \\ -22 \\ -28 \\ -52 \\ -70 \\ -27 \\ -34 \\ -16 \\ \end{array}$	nenburg = 0, so $l_1$ -39 0 -9 3 -15 -34 2 -10 -22 20 -24 -16 -10	$\begin{array}{c} \text{-Kruggel spaces} \\ 2=5/18 \\ \hline \\ & \begin{array}{c} s_1 \\ \hline \\ -7/16 \\ -45/112 \\ -41/112 \\ -37/112 \\ -33/112 \\ -29/112 \\ -25/112 \\ -3/16 \\ -17/112 \\ -13/112 \\ -9/112 \\ -5/112 \\ \end{array}$
sum 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	$\begin{array}{c} \text{with} \   r \\ k_0 \\ \hline \\ -54 \\ -36 \\ -130 \\ -54 \\ -10 \\ -78 \\ -37 \\ -30 \\ -60 \\ -34 \\ -36 \\ -42 \\ -106 \\ -84 \\ \end{array}$	$\begin{array}{c} \text{sm class} \\  =3,s \\  =3,s \\ \hline \\ 0 \\ 6 \\ 47 \\ 6 \\ -1 \\ 30 \\ -1 \\ -6 \\ -12 \\ 11 \\ 18 \\ 0 \\ 35 \\ 24 \\ \end{array}$	$\begin{array}{c} \text{s of Esch} \\ \text{s} = 1, \ p_1 \\ l_0 \\ \hline \\ -37 \\ -25 \\ -114 \\ -34 \\ -6 \\ -73 \\ -30 \\ -25 \\ -43 \\ -30 \\ -25 \\ -34 \\ -54 \\ -82 \\ \end{array}$	henburg- $l_1 = 0, s_2$ $l_1$ -25 -13 0 -25 -6 11 -12 -13 -34 0 -10 -13 -54 17	$\begin{array}{c} \text{-Kruggel spaces} \\ 2 = 1/36 \\ \hline \\ 81 \\ \hline \\ -53/112 \\ -7/16 \\ -45/112 \\ -41/112 \\ -37/112 \\ -33/112 \\ -29/112 \\ -25/112 \\ -3/16 \\ -17/112 \\ -13/112 \\ -9/112 \\ -5/112 \\ -1/112 \\ \end{array}$	sum 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	with $ r $ $k_0$ -76  -4  -22  -52  -46  -93  -24  -39  -75  -72  -34  -51  -21  -22	$\begin{array}{c} \text{sm class} \\  =3,s \\ \hline \\ -34 \\ 2 \\ 2 \\ 14 \\ 8 \\ 45 \\ 9 \\ 15 \\ 27 \\ 33 \\ -16 \\ 24 \\ -3 \\ 2 \end{array}$	$\begin{array}{c} \text{s of Esch} \\ = 1, \ p_1 \\ l_0 \\ \hline \\ -72 \\ -3 \\ -15 \\ -48 \\ -33 \\ -58 \\ -22 \\ -28 \\ -52 \\ -70 \\ -27 \\ -34 \\ -16 \\ -21 \\ \end{array}$	nenburg = 0, $s$ , $l_1$ -39 0 -9 3 -15 -34 2 -10 -22 20 -24 -16 -10 0	
sum 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	with $ r $ $k_0$ -54 -130 -54 -10 -78 -37 -30 -60 -34 -36 -42 -106	$\begin{array}{c} \text{sm class} \\  =3,s \\  =3,s \\ k_1 \end{array}$ $\begin{array}{c} 0 \\ 6 \\ 47 \\ 6 \\ -1 \\ 30 \\ -1 \\ -6 \\ -12 \\ 11 \\ 18 \\ 0 \\ 35 \end{array}$	$\begin{array}{c} \text{s of Esch} \\ \text{s} = 1, \ p_1 \\ l_0 \\ \hline \\ -37 \\ -25 \\ -114 \\ -34 \\ -6 \\ -73 \\ -30 \\ -25 \\ -43 \\ -30 \\ -25 \\ -34 \\ -54 \\ \end{array}$	henburgh he	$\begin{array}{c} \text{-Kruggel spaces} \\ 2 = 1/36 \\ \hline \\ -53/112 \\ -7/16 \\ -45/112 \\ -41/112 \\ -37/112 \\ -33/112 \\ -29/112 \\ -25/112 \\ -3/16 \\ -17/112 \\ -13/112 \\ -9/112 \\ -5/112 \\ \end{array}$	sum 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	$\begin{array}{c} \text{with }   r \\ k_0 \\ \hline \\ -76 \\ -4 \\ -22 \\ -52 \\ -46 \\ -93 \\ -24 \\ -39 \\ -75 \\ -72 \\ -34 \\ -51 \\ -21 \\ \end{array}$	sm class $ \cdot  = 3$ , $s$ $k_1$ -34 2 2 14 8 45 9 15 27 33 -16 24 -3	$\begin{array}{c} \text{s of Esch} \\ = 1, \ p_1 \\ l_0 \\ \hline \\ -72 \\ -3 \\ -15 \\ -48 \\ -33 \\ -58 \\ -22 \\ -28 \\ -52 \\ -70 \\ -27 \\ -34 \\ -16 \\ \end{array}$	nenburg = 0, so $l_1$ -39 0 -9 3 -15 -34 2 -10 -22 20 -24 -16 -10	$ \begin{array}{c} \text{-Kruggel spaces} \\ 2=5/18 \\ \hline \\ & \begin{array}{c} s_1 \\ \hline \\ & -53/112 \\ & -7/16 \\ & -45/112 \\ & -41/112 \\ & -37/112 \\ & -33/112 \\ & -29/112 \\ & -25/112 \\ & -3/16 \\ & -17/112 \\ & -13/112 \\ & -9/112 \\ & -5/112 \\ & -1/112 \\ & -1/112 \\ & 3/112 \end{array} $
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0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	$\begin{array}{c} \text{with} \   r \\ \hline k_0 \\ \hline \\ -54 \\ -36 \\ -130 \\ -54 \\ -10 \\ -78 \\ -37 \\ -30 \\ -60 \\ -34 \\ -36 \\ -42 \\ -106 \\ -84 \\ -82 \\ -97 \\ -61 \\ -120 \\ -126 \\ -25 \\ -48 \\ \end{array}$	$\begin{array}{c} \text{sm class} \\  =3,s \\ \hline \\ \frac{k_1}{k_1} \\ \hline \\ 0 \\ 6 \\ 47 \\ 6 \\ 6 \\ -1 \\ 30 \\ -1 \\ -1 \\ 8 \\ 0 \\ 35 \\ 24 \\ 29 \\ 35 \\ 23 \\ 36 \\ 24 \\ 11 \\ -6 \\ \end{array}$	$\begin{array}{c} \text{s of Esch} \\ \text{s} = 1, p_1 \\ \hline 0 \\ \hline \\ -37 \\ -25 \\ -114 \\ -34 \\ -6 \\ -73 \\ -30 \\ -25 \\ -43 \\ -30 \\ -25 \\ -43 \\ -30 \\ -25 \\ -43 \\ -34 \\ -54 \\ -82 \\ -72 \\ -66 \\ -42 \\ -103 \\ -121 \\ -188 \\ -34 \\ -34 \\ \end{array}$	henburg- $1 = 0, s_2$ $1 = 0, s_2$ 1 =	$\begin{array}{c} \text{-Kruggel spaces} \\ 2 = 1/36 \\ \hline \\ & s_1 \\ \hline \\ & -53/112 \\ & -7/16 \\ & -45/112 \\ & -41/112 \\ & -37/112 \\ & -37/112 \\ & -37/112 \\ & -29/112 \\ & -25/112 \\ & -3/16 \\ & -17/112 \\ & -13/112 \\ & -13/112 \\ & -13/112 \\ & -1/112 \\ &$	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	$\begin{array}{c} \text{with} \   r \\ k_0 \end{array}$ $\begin{array}{c} -76 \\ -4 \\ -22 \\ -52 \\ -46 \\ -93 \\ -24 \\ -39 \\ -75 \\ -72 \\ -34 \\ -51 \\ -21 \\ -221 \\ -257 \\ -48 \\ -111 \\ -10 \\ -72 \\ -58 \\ -87 \end{array}$	$\begin{array}{c} \text{sm class} \\  =3,s \\ \hline \\ k_1 \\ \\ -34 \\ 2 \\ 2 \\ 2 \\ 14 \\ 8 \\ 45 \\ 9 \\ 15 \\ 27 \\ 33 \\ -16 \\ 24 \\ -3 \\ 2 \\ -15 \\ 15 \\ 39 \\ 2 \\ 27 \\ 26 \\ -9 \\ \end{array}$	$\begin{array}{c} \text{s of Esch} \\ = 1, \ p_1 \\ \hline \\ -10 \\ -23 \\ -15 \\ -48 \\ -33 \\ -58 \\ -22 \\ -20 \\ -27 \\ -34 \\ -16 \\ -21 \\ -52 \\ -46 \\ -106 \\ -9 \\ -64 \\ -45 \\ -70 \\ \end{array}$	enburg = 0, s:	$\begin{array}{c} \text{-Kruggel spaces} \\ 2=5/18 \\ \hline \\ & 51 \\ \hline \\ & -53/112 \\ & -7/16 \\ & -45/112 \\ & -41/112 \\ & -37/112 \\ & -33/112 \\ & -29/112 \\ & -25/112 \\ & -3/16 \\ & -17/112 \\ & -13/112 \\ & -13/112 \\ & -5/112 \\ & -1/112 \\ & -5/112 \\ & -1/112 \\ & 1/16 \\ & 11/112 \\ & 15/112 \\ & 19/112 \\ & 23/112 \\ & 27/112 \\ \hline \end{array}$
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0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	$\begin{array}{c} \text{with} \   r \\ \hline k_0 \\ \hline \\ -54 \\ -36 \\ -36 \\ -130 \\ -54 \\ -10 \\ -78 \\ -37 \\ -30 \\ -60 \\ -34 \\ -36 \\ -42 \\ -106 \\ -84 \\ -82 \\ -97 \\ -61 \\ -120 \\ -126 \\ -25 \\ -48 \\ -96 \\ -25 \\ -48 \\ -96 \\ -82 \\ -114 \\ \end{array}$	$\begin{array}{c} \text{sm class} \\  =3,s \\ \hline \\ \frac{k_1}{k_1} \\ \hline \\ 0 \\ 6 \\ 47 \\ 6 \\ 6 \\ -1 \\ 30 \\ -1 \\ -1 \\ -6 \\ -12 \\ 11 \\ 18 \\ 0 \\ 35 \\ 24 \\ 29 \\ 35 \\ 23 \\ 36 \\ 24 \\ 11 \\ -6 \\ 42 \\ -1 \\ -36 \\ \end{array}$	$\begin{array}{c} \text{s of Esch} \\ \text{s} = 1, \ p_1 \\ l_0 \\ \hline \\ -37 \\ -25 \\ -114 \\ -34 \\ -66 \\ -73 \\ -30 \\ -25 \\ -43 \\ -30 \\ -25 \\ -43 \\ -34 \\ -54 \\ -82 \\ -72 \\ -66 \\ -42 \\ -103 \\ -121 \\ -18 \\ -34 \\ -61 \\ -72 \\ -97 \end{array}$	henburg- $1 = 0, s_2$ $1 = 0, s_2$ 1 =	$\begin{array}{c} \text{-Kruggel spaces} \\ 2 = 1/36 \\ \hline \\ & -53/112 \\ -7/16 \\ -45/112 \\ -41/112 \\ -37/112 \\ -33/112 \\ -29/112 \\ -29/112 \\ -25/112 \\ -3/16 \\ -17/112 \\ -13/112 \\ -13/112 \\ -9/112 \\ -5/112 \\ -1/112 \\ 3/112 \\ 1/16 \\ 11/112 \\ 19/112 \\ 23/112 \\ 27/112 \\ 3/112 \\ 19/112 \\ 23/112 \\ 3/112 \\ 5/16 \\ 39/112 \\ \end{array}$	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	$\begin{array}{c} \text{with} \   r \\ k_0 \end{array}$ $\begin{array}{c} -76 \\ -4 \\ -22 \\ -52 \\ -46 \\ -93 \\ -24 \\ -39 \\ -75 \\ -72 \\ -34 \\ -51 \\ -21 \\ -221 \\ -257 \\ -48 \\ -111 \\ -10 \\ -72 \\ -587 \\ -16 \\ -28 \\ -81 \end{array}$	$\begin{array}{c} \text{sm class} \\ \text{sm class} \\ \text{l} = 3, s \\ \hline k_1 \\ \\ 2 \\ 2 \\ 14 \\ 8 \\ 45 \\ 9 \\ 15 \\ 27 \\ 33 \\ -16 \\ 24 \\ -3 \\ 2 \\ -15 \\ 139 \\ 2 \\ 27 \\ 26 \\ -9 \\ 2 \\ 27 \\ 26 \\ -9 \\ 2 \\ 39 \\ \end{array}$	$\begin{array}{c} \text{s of Esch} \\ \text{s of Esch} \\ \text{s of Esch} \\ \text{s of Esch} \\ \text{lo} \\ \\ -72 \\ -33 \\ -15 \\ -48 \\ -33 \\ -58 \\ -22 \\ -28 \\ -52 \\ -27 \\ -34 \\ -16 \\ -21 \\ -52 \\ -46 \\ -21 \\ -52 \\ -46 \\ -106 \\ -9 \\ -64 \\ -45 \\ -70 \\ -15 \\ -22 \\ -70 \\ -15 \\ -27 \\ -15 \\ -27 \\ -27 \\ -27 \\ -37 \\ -38 \\ -$	nenburg $= 0, s$ : $\frac{1}{l_1}$ $\frac{-39}{0}$ $\frac{-9}{0}$ $\frac{-34}{0}$ $\frac{-22}{0}$ $\frac{-24}{0}$ $\frac{-16}{0}$ $\frac{-22}{0}$ $\frac{8}{0}$ $\frac{20}{0}$ $\frac{-34}{0}$ $\frac{-34}{0}$ $\frac{-15}{0}$	-Kruggel spaces $_2=5/18$ $\begin{array}{r} s_1 \\ -53/112 \\ -7/16 \\ -45/112 \\ -41/112 \\ -37/112 \\ -33/112 \\ -29/112 \\ -25/112 \\ -3/16 \\ -17/112 \\ -13/112 \\ -13/112 \\ -5/112 \\ -1/112 \\ 1/16 \\ 11/112 \\ 15/112 \\ 19/112 \\ 23/112 \\ 23/112 \\ 27/112 \\ 31/112 \\ 19/112 \\ 33/112 \\ 19/112 \\ 33/112 \\ 19/112 \\ 33/112 \\ 19/112 \\ 33/112 \\ 31/112 \\ 5/16 \\ 39/112 \\ 5/16 \\ 39/112 \\ \end{array}$
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	$\begin{array}{c} \text{with} \   r \\ k_0 \\ \hline \\ -54 \\ -36 \\ -130 \\ -54 \\ -10 \\ -78 \\ -37 \\ -30 \\ -60 \\ -34 \\ -36 \\ -42 \\ -106 \\ -84 \\ -97 \\ -61 \\ -120 \\ -126 \\ -25 \\ -48 \\ -96 \\ -82 \\ -91 \\ -14 \\ -60 \\ \end{array}$	$\begin{array}{c} \text{sm class} \\  =3,s \\ \hline \\ k_1 \\ \hline \\ 0 \\ 6 \\ 47 \\ 6 \\ 6 \\ -1 \\ 30 \\ -1 \\ -6 \\ -12 \\ 11 \\ 18 \\ 0 \\ 35 \\ 24 \\ 11 \\ -6 \\ 6 \\ -12 \\ 11 \\ 18 \\ 0 \\ 35 \\ 24 \\ 29 \\ 35 \\ 23 \\ 36 \\ 24 \\ 11 \\ -6 \\ 42 \\ -1 \\ -1 \\ -1 \\ -1 \\ -1 \\ -1 \\ -1 \\ -$	$\begin{array}{c} \text{s of Esch} \\ \text{s} = 1, \ p_1 \\ l_0 \\ \hline -37 \\ -25 \\ -114 \\ -34 \\ -30 \\ -25 \\ -43 \\ -30 \\ -25 \\ -43 \\ -30 \\ -25 \\ -43 \\ -30 \\ -25 \\ -43 \\ -30 \\ -21 \\ -34 \\ -54 \\ -82 \\ -72 \\ -66 \\ -42 \\ -103 \\ -121 \\ -18 \\ -34 \\ -61 \\ -72 \\ -97 \\ -58 \\ \end{array}$	henburg- $l = 0, s_2$ $l_1$ -2s -13 0 -2s -6 11 -12 -13 -34 0 -10 -13 -54 17 0 -30 -30 -11 -30	$\begin{array}{c} \text{-Kruggel spaces} \\ 2 = 1/36 \\ \hline \\ & s_1 \\ \hline \\ & -53/112 \\ & -7/16 \\ & -45/112 \\ & -41/112 \\ & -37/112 \\ & -37/112 \\ & -3/16 \\ & -17/112 \\ & -3/16 \\ & -17/112 \\ & -13/112 \\ & -9/112 \\ & -5/112 \\ & -1/112 \\ & -1/112 \\ & -1/112 \\ & 1/16 \\ & 11/112 \\ & 15/112 \\ & 19/112 \\ & 23/112 \\ & 27/112 \\ & 3/112 \\ & 3/112 \\ & 3/112 \\ & 5/16 \\ & 39/112 \\ & 43/112 \\ \end{array}$	sum 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	$\begin{array}{c} \text{with} \   r \\ k_0 \end{array}$ $\begin{array}{c} -76 \\ -4 \\ -22 \\ -52 \\ -46 \\ -93 \\ -24 \\ -39 \\ -75 \\ -72 \\ -34 \\ -21 \\ -22 \\ -57 \\ -48 \\ -111 \\ -10 \\ -72 \\ -52 \\ -87 \\ -16 \\ -28 \\ -81 \\ -281 \\ -48 \end{array}$	$\begin{array}{c} \text{sm class} \\  =3,s \\  =3,s \\ \hline \\ k_1 \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\$	$\begin{array}{c} \text{s of Esch} \\ \text{-} \\ -$	nenburg $= 0, s$ : $l_1$ $-39$ $0$ $-9$ $3$ $-35$ $-34$ $2$ $-10$ $-22$ $20$ $-24$ $-16$ $-10$ $0$ $-22$ $8$ $20$ $0$ $-24$ $0$ $0$ $0$ $0$ $0$ $0$ $0$ $0$ $0$ $0$	$\begin{array}{c} \text{-Kruggel spaces} \\ 2=5/18 \\ \hline \\ & -53/112 \\ & -7/16 \\ & -45/112 \\ & -41/112 \\ & -37/112 \\ & -33/112 \\ & -29/112 \\ & -25/112 \\ & -3/16 \\ & -17/112 \\ & -13/112 \\ & -9/112 \\ & -5/112 \\ & -1/112 \\ & -1/112 \\ & 1/16 \\ & 11/112 \\ & 15/112 \\ & 19/112 \\ & 23/112 \\ & 27/112 \\ & 31/112 \\ & 5/16 \\ & 39/112 \\ & 43/112 \\ \end{array}$
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	$\begin{array}{c} \text{with} \   r \\ k_0 \\ \hline \\ -54 \\ -36 \\ -130 \\ -54 \\ -10 \\ -78 \\ -37 \\ -30 \\ -60 \\ -34 \\ -36 \\ -42 \\ -106 \\ -84 \\ -82 \\ -106 \\ -25 \\ -48 \\ -97 \\ -61 \\ -126 \\ -25 \\ -48 \\ -96 \\ -82 \\ -114 \\ -60 \\ -12 \\ \end{array}$	$\begin{array}{c} \text{sm class} \\  =3,s \\  =3,s \\ \hline \\ 0 \\ 6 \\ 47 \\ 6 \\ 6 \\ -1 \\ 30 \\ -1 \\ -6 \\ -12 \\ 11 \\ 18 \\ 0 \\ 35 \\ 24 \\ 29 \\ 35 \\ 23 \\ 36 \\ 24 \\ 29 \\ 35 \\ -6 \\ -1 \\ -36 \\ 18 \\ 6 \\ \end{array}$	$\begin{array}{c} \text{s of Esch} \\ \text{s} = 1, \ p_1 \\ l_0 \\ \\ -37 \\ -25 \\ -114 \\ -34 \\ -6 \\ -73 \\ -30 \\ -25 \\ -43 \\ -30 \\ -25 \\ -44 \\ -25 \\ -34 \\ -54 \\ -82 \\ -72 \\ -66 \\ -42 \\ -103 \\ -121 \\ -18 \\ -34 \\ -61 \\ -72 \\ -97 \\ -58 \\ -10 \end{array}$	henburgh he	$\begin{array}{c} \text{-Kruggel spaces} \\ 2 = 1/36 \\ \hline \\ s_1 \\ \hline \\ -53/112 \\ -7/16 \\ -45/112 \\ -41/112 \\ -41/112 \\ -37/112 \\ -33/112 \\ -29/112 \\ -25/112 \\ -3/16 \\ -17/112 \\ -3/16 \\ -17/112 \\ -3/112 \\ -9/112 \\ -5/112 \\ -1/112 \\ 3/112 \\ 1/16 \\ 11/112 \\ 15/112 \\ 19/112 \\ 23/112 \\ 27/112 \\ 31/112 \\ 27/112 \\ 31/112 \\ 43/112 \\ 43/112 \\ 44/112 \\ \end{array}$	sum 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	$\begin{array}{c} \text{with} \   r \\ k_0 \end{array}$ $\begin{array}{c} -76 \\ -4 \\ -22 \\ -52 \\ -46 \\ -93 \\ -24 \\ -39 \\ -75 \\ -72 \\ -34 \\ -51 \\ -21 \\ -22 \\ -57 \\ -48 \\ -111 \\ -10 \\ -72 \\ -52 \\ -87 \\ -16 \\ -28 \\ -81 \\ -48 \\ -81 \\ -48 \\ -70 \end{array}$	$\begin{array}{c} \text{sm class} \\  =3,s \\ k_1 \\ k_1 \\ 2 \\ 2 \\ 14 \\ 8 \\ 45 \\ 9 \\ 9 \\ 15 \\ 27 \\ 33 \\ -16 \\ 24 \\ -3 \\ 3 \\ 2 \\ -15 \\ 15 \\ 39 \\ 2 \\ 27 \\ 26 \\ -9 \\ 2 \\ -10 \\ -39 \\ 9 \\ 26 \end{array}$	$\begin{array}{l} \text{s of Esch} \\ \text{s of Esch} \\ \text{s of Esch} \\ \text{s of Esch} \\ \text{lo} \\ \\ -72 \\ -3 \\ -15 \\ -48 \\ -33 \\ -58 \\ -22 \\ -28 \\ -52 \\ -27 \\ -34 \\ -16 \\ -21 \\ -52 \\ -46 \\ -21 \\ -52 \\ -46 \\ -106 \\ -9 \\ -64 \\ -45 \\ -70 \\ -15 \\ -24 \\ -70 \\ -34 \\ -48 \\ \end{array}$	nenburg $= 0, s$ : $l_1$ $-39$ $0$ $-9$ $3$ $-15$ $-34$ $2$ $-10$ $-22$ $20$ $-24$ $-16$ $-10$ $0$ $-22$ $8$ $20$ $0$ $0$ $-25$ $-34$ $0$ $0$ $-25$ $-34$ $0$ $-25$ $-34$ $0$ $-25$ $-34$ $0$ $-25$ $-34$ $0$ $-25$ $-34$ $0$ $-25$ $-34$ $0$ $-25$ $-34$ $-35$ $-$	$\begin{array}{c} \text{-Kruggel spaces} \\ 2=5/18 \\ \hline \\ & -53/112 \\ & -7/16 \\ & -45/112 \\ & -41/112 \\ & -37/112 \\ & -33/112 \\ & -29/112 \\ & -25/112 \\ & -3/16 \\ & -17/112 \\ & -13/112 \\ & -9/112 \\ & -5/112 \\ & -1/112 \\ & 3/112 \\ & -1/112 \\ & 1/16 \\ & 11/112 \\ & 15/112 \\ & 19/112 \\ & 23/112 \\ & 27/112 \\ & 3/112 \\ & 1/66 \\ & 31/112 \\ & 3/112 \\ & 43/112 \\ & 43/112 \\ & 43/112 \\ \end{array}$
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	$\begin{array}{c} \text{with} \   r \\ \hline k_0 \\ \hline \\ -54 \\ -36 \\ -36 \\ -130 \\ -54 \\ -10 \\ -78 \\ -37 \\ -30 \\ -60 \\ -34 \\ -36 \\ -42 \\ -106 \\ -84 \\ -82 \\ -97 \\ -61 \\ -120 \\ -126 \\ -25 \\ -48 \\ -96 \\ -82 \\ -114 \\ -60 \\ -12 \\ -36 \\ \end{array}$	$\begin{array}{c} \text{sm class} \\  =3,s \\ \hline \\ \frac{k_1}{k_1} \\ \hline \\ 0 \\ 6 \\ 47 \\ 6 \\ 6 \\ -1 \\ 30 \\ -1 \\ -1 \\ -6 \\ -12 \\ 11 \\ 18 \\ 0 \\ 35 \\ 24 \\ 29 \\ 35 \\ 23 \\ 36 \\ 24 \\ 11 \\ -6 \\ 42 \\ -1 \\ -36 \\ 18 \\ 6 \\ 6 \\ 12 \\ \end{array}$	$\begin{array}{c} \text{s of Esch} \\ \text{s} = 1, \ p_1 \\ l_0 \\ \hline \\ -37 \\ -25 \\ -114 \\ -34 \\ -66 \\ -73 \\ -33 \\ -30 \\ -25 \\ -43 \\ -34 \\ -54 \\ -82 \\ -72 \\ -66 \\ -42 \\ -103 \\ -121 \\ -18 \\ -34 \\ -61 \\ -72 \\ -97 \\ -58 \\ -10 \\ -34 \\ \end{array}$	henburg- $1 = 0, s_2$ $1 = 0, s_2$ 1 =	$\begin{array}{c} \text{-Kruggel spaces} \\ 2 = 1/36 \\ \hline \\ & -53/112 \\ -7/16 \\ -45/112 \\ -41/112 \\ -37/112 \\ -33/112 \\ -29/112 \\ -29/112 \\ -25/112 \\ -3/16 \\ -17/112 \\ -13/112 \\ -13/112 \\ -13/112 \\ -11/1$	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	$\begin{array}{c} \text{with} \   r \\ k_0 \end{array}$ $\begin{array}{c} -76 \\ -4 \\ -22 \\ -52 \\ -46 \\ -93 \\ -24 \\ -39 \\ -75 \\ -72 \\ -34 \\ -51 \\ -21 \\ -221 \\ -57 \\ -48 \\ -111 \\ -10 \\ -72 \\ -58 \\ -116 \\ -28 \\ -81 \\ -48 \\ -70 \\ -34 \end{array}$	$\begin{array}{c} \text{sm class} \\ \text{sm class} \\ \text{l} = 3, s \\ \hline k_1 \\ \\ 2 \\ 2 \\ 14 \\ 8 \\ 45 \\ 9 \\ 15 \\ 27 \\ 33 \\ -16 \\ 24 \\ -3 \\ 2 \\ -15 \\ 139 \\ 2 \\ 27 \\ 26 \\ -9 \\ 2 \\ 27 \\ -9 \\ 2 \\ 0 \\ -9 \\ 2 \\ 10 \\ -39 \\ 9 \\ 26 \\ 14 \\ \end{array}$	$\begin{array}{c} \text{s of Esch} \\ \text{s of Esch} \\ \text{s of Esch} \\ \text{s of Esch} \\ \text{lo} \\ \\ -72 \\ -33 \\ -15 \\ -48 \\ -33 \\ -58 \\ -22 \\ -28 \\ -52 \\ -27 \\ -34 \\ -16 \\ -21 \\ -52 \\ -46 \\ -21 \\ -52 \\ -46 \\ -9 \\ -64 \\ -45 \\ -70 \\ -15 \\ -24 \\ -70 \\ -34 \\ -48 \\ -48 \\ -48 \\ -24 \\ -48 \\ -24 \\ -24 \\ -24 \\ -24 \\ -24 \\ -24 \\ -24 \\ -24 \\ -24 \\ -24 \\ -24 \\ -24 \\ -24 \\ -26 \\ -27 \\ -28 \\ -27 \\ -28 \\ -2$	nenburg $= 0, s$ : $l_1$ $-39$ $0$ $-9$ $3$ $-15$ $-34$ $2$ $2$ $2$ $0$ $-22$ $20$ $0$ $-22$ $8$ $2$ $0$ $0$ $-22$ $8$ $0$ $0$ $0$ $0$ $0$ $0$ $0$ $0$ $0$ $0$	-Kruggel spaces $_2=5/18$ $\begin{array}{r} s_1 \\ -53/112 \\ -7/16 \\ -45/112 \\ -41/112 \\ -37/112 \\ -33/112 \\ -29/112 \\ -25/112 \\ -3/16 \\ -17/112 \\ -13/112 \\ -9/112 \\ -5/112 \\ -1/112 \\ -5/112 \\ 1/16 \\ 11/112 \\ 15/112 \\ 19/112 \\ 23/112 \\ 23/112 \\ 27/112 \\ 31/112 \\ 43/112 \\ 43/112 \\ 43/112 \\ 43/112 \\ 47/112 \\ 51/112 \\ 51/112 \\ \end{array}$
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	$\begin{array}{c} \text{with} \   r \\ k_0 \\ \hline \\ -54 \\ -36 \\ -130 \\ -54 \\ -10 \\ -78 \\ -37 \\ -30 \\ -60 \\ -34 \\ -36 \\ -42 \\ -106 \\ -84 \\ -82 \\ -106 \\ -25 \\ -48 \\ -97 \\ -61 \\ -126 \\ -25 \\ -48 \\ -96 \\ -82 \\ -114 \\ -60 \\ -12 \\ \end{array}$	$\begin{array}{c} \text{sm class} \\  =3,s \\  =3,s \\ \hline \\ 0 \\ 6 \\ 47 \\ 6 \\ 6 \\ -1 \\ 30 \\ -1 \\ -6 \\ -12 \\ 11 \\ 18 \\ 0 \\ 35 \\ 24 \\ 29 \\ 35 \\ 23 \\ 36 \\ 24 \\ 29 \\ 35 \\ -6 \\ -1 \\ -36 \\ 18 \\ 6 \\ \end{array}$	$\begin{array}{c} \text{s of Esch} \\ \text{s} = 1, \ p_1 \\ l_0 \\ \\ -37 \\ -25 \\ -114 \\ -34 \\ -6 \\ -73 \\ -30 \\ -25 \\ -43 \\ -30 \\ -25 \\ -43 \\ -30 \\ -25 \\ -34 \\ -54 \\ -82 \\ -72 \\ -66 \\ -42 \\ -103 \\ -121 \\ -18 \\ -34 \\ -61 \\ -72 \\ -97 \\ -58 \\ -10 \end{array}$	henburgh he	$\begin{array}{c} \text{-Kruggel spaces} \\ 2 = 1/36 \\ \hline \\ s_1 \\ \hline \\ -53/112 \\ -7/16 \\ -45/112 \\ -41/112 \\ -41/112 \\ -37/112 \\ -33/112 \\ -29/112 \\ -25/112 \\ -3/16 \\ -17/112 \\ -3/16 \\ -17/112 \\ -3/112 \\ -9/112 \\ -5/112 \\ -1/112 \\ 3/112 \\ 1/16 \\ 11/112 \\ 15/112 \\ 19/112 \\ 23/112 \\ 27/112 \\ 31/112 \\ 27/112 \\ 31/112 \\ 43/112 \\ 43/112 \\ 44/112 \\ \end{array}$	sum 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	$\begin{array}{c} \text{with} \   r \\ k_0 \end{array}$ $\begin{array}{c} -76 \\ -4 \\ -22 \\ -52 \\ -46 \\ -93 \\ -24 \\ -39 \\ -75 \\ -72 \\ -34 \\ -51 \\ -21 \\ -22 \\ -57 \\ -48 \\ -111 \\ -10 \\ -72 \\ -52 \\ -87 \\ -16 \\ -28 \\ -81 \\ -48 \\ -81 \\ -48 \\ -70 \end{array}$	$\begin{array}{c} \text{sm class} \\  =3,s \\ k_1 \\ k_1 \\ 2 \\ 2 \\ 14 \\ 8 \\ 45 \\ 9 \\ 9 \\ 15 \\ 27 \\ 33 \\ -16 \\ 24 \\ -3 \\ 3 \\ 2 \\ -15 \\ 15 \\ 39 \\ 2 \\ 27 \\ 26 \\ -9 \\ 2 \\ -10 \\ -39 \\ 9 \\ 26 \end{array}$	$\begin{array}{l} \text{s of Esch} \\ \text{s of Esch} \\ \text{s of Esch} \\ \text{s of Esch} \\ \text{lo} \\ \\ -72 \\ -3 \\ -15 \\ -48 \\ -33 \\ -58 \\ -22 \\ -28 \\ -52 \\ -27 \\ -34 \\ -16 \\ -21 \\ -52 \\ -46 \\ -21 \\ -52 \\ -46 \\ -106 \\ -9 \\ -64 \\ -45 \\ -70 \\ -15 \\ -24 \\ -70 \\ -34 \\ -48 \\ \end{array}$	nenburg $= 0, s$ : $l_1$ $-39$ $0$ $-9$ $3$ $-15$ $-34$ $2$ $-10$ $-22$ $20$ $-24$ $-16$ $-10$ $0$ $-22$ $8$ $20$ $0$ $0$ $-25$ $-34$ $0$ $0$ $-25$ $-34$ $0$ $-25$ $-34$ $0$ $-25$ $-34$ $0$ $-25$ $-34$ $0$ $-25$ $-34$ $0$ $-25$ $-34$ $0$ $-25$ $-34$ $-35$ $-$	$\begin{array}{c} \text{-Kruggel spaces} \\ 2=5/18 \\ \hline \\ & 51 \\ \hline \\ & -53/112 \\ & -7/16 \\ & -45/112 \\ & -41/112 \\ & -37/112 \\ & -33/112 \\ & -29/112 \\ & -25/112 \\ & -3/16 \\ & -17/112 \\ & -13/112 \\ & -9/112 \\ & -1/11$

Table 7: Smallest Eschenburg-Kruggel spaces with  $|r|=5,\,s_2\geq 0.$ 

		Smoot	h struct	ures on	a			Smoot	h struct	ures on	a
home	omorphi				-Kruggel space:	s home	eomorphi				g-Kruggel spaces
	with  1				$s_2 = 0/1$		with $ r $	= 5, s			$s_2 = 1/12$
$\operatorname{sum}$	$k_0$	$k_1$	$l_0$	$l_1$	$s_1$	sum	$k_0$	$k_1$	$l_0$	$l_1$	$s_1$
0	-168	52	-161	28	-69/140	) 1	-69	35	-42	-26	-69/140
0	-128	12	-92	-47	-16/35		-96	44	-95	35	-16/35
0	-81	-27	-64	-48	-59/140		-99	25	-91	4	-59/140
0	-228	112	-177	-36	-27/70		-35	15	-32	4	-27/70
0	-76	-7	-48	-44	-7/20		-86	18	-85	15	-7/20
0	-87	3	-68	-28	-11/35		-55	25	-51	8	-11/35
0	-124 $-187$	$-48 \\ -1$	-121 $-144$	$-52 \\ -68$	-39/140 $-17/70$		-59 $-95$	$-5 \\ -5$	$-52 \\ -91$	$-16 \\ -12$	-39/140 $-17/70$
0	-88	16	-144 $-57$	-36	-29/140		$-95 \\ -27$	-6	-25	-12 -9	-29/140
0	-147	39	-84	-68	-6/35		-75	5	-51	-32	-6/35
0	-116	13	-108	-4	-19/140		-45	21	-32	-11	-19/140
0	-47	4	-28	-24	-1/10		-106	53	-89	-5	-1/10
0	-168	16	-157	-7	-9/140		-91	24	-79	-5	-9/140
0	$-161 \\ -228$	28 56	$-88 \\ -157$	$-84 \\ -76$	-1/35		$-91 \\ -91$	18 44	-65	$-29 \\ -35$	-1/35
0	-228 -164	72	-157 -156	33	1/140 3/70		-36	8	$-55 \\ -35$	- 55 5	$\frac{1/140}{3/70}$
0	-12	3	-8	-4	11/140		-65	11	-46	-22	11/140
0	-172	83	-168	52	4/3		-75	31	-67	4	4/35
0	-52	-1	-48	-8	3/20		-25	1	-16	-12	3/20
0	-64	12	-37	-31	13/70		-109	55	-91	-6	13/70
0	-108	32	-107	28	31/140		-149	$75 \\ -6$	-86	$-62 \\ -25$	31/140
0	-188 $-124$	56 -8	$-101 \\ -77$	$-92 \\ -71$	9/35 41/140		$-62 \\ -11$	$-6 \\ -2$	$-49 \\ -9$	-25 $-5$	9/35 $41/140$
0	-67	23	-64	12	23/70		-96	13	-75	-25	23/70
0	-127	59	-108	-4	51/140		-32	-11	-29	-15	51/140
0	-212	103	-204	52	2/		-16	4	-15	1	2/5
0	-144	32	-137	13	61/140		-55	15	$-51 \\ -76$	4	61/140
0	-24	-8	-21	-12	33/70	) 1	-105	21	- 70	-32	33/70
1	1.			ures on	a		1.	Smoot	h struct		
home		sm clas	s of Esc	henburg	a -Kruggel space:			Smootl sm class	h struct s of Esc	henburg	g-Kruggel spaces
	with  1	$ \sin clas  = 5, s$	s of Esc s = -2,	henburg $p_1 = 2$ ,	a -Kruggel space $s_2 = 1/6$	s home	with $ r $	Smoot! sm class: $  = 5, s$	h struct s of Esci = -2,	henburg $p_1 = 2$ ,	g-Kruggel spaces $s_2 = 1/4$
sum	with $ i $ $k_0$	$ \sin clas  = 5, s$ $k_1$	s of Esc s = -2, $l_0$	henburg $p_1 = 2,$ $l_1$	a -Kruggel space: $s_2 = 1/6$ $s_3$	s home	with $ r  k_0$	Smooth sm class $ s  = 5, s$ $k_1$	h struct s of Esch = -2, $l_0$	henburg $p_1 = 2$ , $l_1$	g-Kruggel spaces $s_2 = 1/4$ $s_1$
	with  r   k <sub>0</sub>	$ \sin c  = 5$ , $ \sin $	s of Esc s = -2, $l_0$	thenburge $p_1 = 2$ , $l_1$	a -Kruggel space: $s_2 = 1/6$ $s_1$ $-69/140$	s home sum	$ \begin{array}{c} \text{with }   r \\ k_0 \\ -166 \end{array} $	Smooth sm class $ =5, s$ $k_1$ 38	h structs of Escheric $= -2$ , $l_0$	henburg $p_1 = 2$ , $l_1$	g-Kruggel spaces $s_2 = 1/4$ $s_1$ $-69/140$
sum -1 -1	with   1   1   1   1   1   1   1   1   1	$ sm class  = 5, s$ $ k_1  = 2$ $ sm class  = 3$	s of Esc s = -2, $l_0$ 45 35	thenburge $p_1 = 2$ , $l_1$ $19$ $15$	a -Kruggel space: $s_2 = 1/6$ $s_1$ $-69/146$ $-16/38$	s home sum 0 0 5 0	with $ r  k_0$ -166 -119	Smooth sm class $ s  = 5$ , $s$ , $k_1$ 38	h structs of Esci = $-2$ , $l_0$ -154 -76	henburg $p_1 = 2,$ $l_1$ $7$ $-52$	$s_2$ -Kruggel spaces $s_2 = 1/4$ $s_1$ $-69/140$ $-16/35$
-1 -1 -1	with   1	$ ssm class   = 5, s   k_1  $ $ c  = 5, s   k_1  $ $ c  = 2  $ $ c  = 3  $ $ c  = 26  $	s of Esc s = -2, $l_0$ 45 35 65	thenburg: $p_1 = 2$ , $l_1$ 19 15 35	a a -Kruggel spaces $s_2 = 1/6$ $s_1 = -69/146$ $-16/38$ $-59/146$	s home sum 0 0 5 0 0 0	with $ r  k_0$ -166 -119 -86	Smooth sm class $ s  = 5$ , $s$ , $k_1$ 38 17 28	h struct s of Escl = $-2$ , $l_0$ -154 -76 -53	henburg $p_1 = 2,$ $l_1$ $7$ $-52$ $-34$	g-Kruggel spaces $s_2 = 1/4$ $s_1$ $-69/140$ $-16/35$ $-59/140$
sum -1 -1	with   1   1   1   1   1   1   1   1   1	$ sm class  = 5, s$ $ k_1  = 2$ $ sm class  = 3$	s of Esc s = -2, $l_0$ 45 35 65	thenburge $p_1 = 2$ , $l_1$ $19$ $15$	a -Kruggel space: $s_2 = 1/6$ $s_1$ $-69/144$ $-16/38$ $-59/144$ $-27/76$	s home sum 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	with $ r  k_0$ -166 -119	Smooth sm class $ s  = 5$ , $s$ , $k_1$ 38	h structs of Esci = $-2$ , $l_0$ -154 -76	henburg $p_1 = 2,$ $l_1$ $7$ $-52$	g-Kruggel spaces $s_2 = 1/4$ $s_1$ $-69/140$ $-16/35$ $-59/140$ $-27/70$
sum -1 -1 -1 -1 -1	with  1 k <sub>0</sub>   56 46 72 36	$ \sin c  = 5$ , $ \sin $	s of Esc s = -2, $l_0$ 45 35 65 35 65	thenburg: $p_1 = 2$ , $l_1$ 19 15 35 -11	a a -Kruggel spaces $s_2 = 1/6$ $s_1 = -69/146$ $-16/38$ $-59/146$	s home sum 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	with $r$ $k_0$ $-166$ $-119$ $-86$ $-122$ $-109$ $-19$	Smooth sm class $  = 5, s \\ k_1 $ 38  17  28  4  22  -3	h struct s of Escl = $-2$ , $l_0$ -154 -76 -53 -113 -72 -12	henburg $p_1 = 2$ , $l_1$ 7  -52  -34  -13  -42  -12	g-Kruggel spaces $s_2 = 1/4$ $s_1$ $-69/140$ $-16/35$ $-59/140$
sum  -1 -1 -1 -1 -1 -1 -1 -1 -1	with $ r $ $k_0$ 56 46 72 36 37 82 56	$ \sin \cos \cos x  = 5, s$ $ \sin \cos x  = 5, s$ $ \cos x  = 1, s$ $ \cos x  =$	s of Esc s = -2, $l_0$ 45 35 65 35 65 55	henburg $p_1 = 2$ , $l_1$ 19 15 35 -11 9 39 -11	a  -Kruggel space: $s_2 = 1/6$ $s_1$ -69/14( -16/3;  -59/14( -27/7( -7/2( -11/3; -39/14(	s home sum 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	with $ r $ $k_0$ -166 -119 -86 -122 -109 -19 -63	Smooth sm class $k_1 = 5$ , $k_2 = 1$ 38 17 28 4 22 -3 22	h struct s of Escl = $-2$ , $l_0$ -154 -76 -53 -113 -72 -12 -32	henburg $p_{1} = 2,$ $l_{1}$ $7$ $-52$ $-34$ $-13$ $-42$ $-12$ $-32$	$\begin{array}{c} \text{g-Kruggel spaces} \\ s_2 = 1/4 \\ \hline \\ s_1 \\ \hline \\ -69/140 \\ -16/35 \\ -59/140 \\ -27/70 \\ -7/20 \\ -11/35 \\ -39/140 \\ \end{array}$
sum  -1 -1 -1 -1 -1 -1 -1 -1 -1 -1	with $ r $ $k_0$ 56 46 72 36 37 82 56 6	$ \sin \cos \cos \sin \cos \sin \cos \cos$	s of Esc s = -2, $l_0$ 45 35 65 35 65 55 5	henburg: $p_1 = 2$ , $l_1$ 19 15 35 -11 9 39 -11 -1	a -Kruggel spaces $s_2 = 1/6$ $s_1$ -69/144 -16/38 -59/144 -27/7 -7/26 -11/38 -39/144 -17/76	s home sum 0	with $ r $ $k_0$ -166 -119 -86 -122 -109 -19 -63 -93	Smooth sm class:   = 5, s $k_1$ 38 17 28 4 22 -3 22 46	h struct s of Escl = $-2$ , $l_0$ -154 -76 -53 -113 -72 -12 -32 -92	henburg $p_{1} = 2,$ $l_{1}$ $7$ $-52$ $-34$ $-13$ $-42$ $-12$ $-32$ $34$	$\begin{array}{c} \text{x-Kruggel spaces} \\ s_2 = 1/4 \\ \hline s_1 \\ \hline -69/140 \\ -16/35 \\ -59/140 \\ -27/70 \\ -7/20 \\ -11/35 \\ -39/140 \\ -17/70 \\ \end{array}$
sum  -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1	with $ r $ $k_0$ 56  46  72  36  37  82  56  6  96	$ sm class  = 5, s = \frac{k_1}{k_1}$	s of Esc s = -2, $l_0$ 45 35 65 35 65 55 65	henburg: $p_1 = 2$ , $l_1$ 19 15 35 -11 9 39 -11 -1 35	a -Kruggel spaces $s_2 = 1/6$ $s_3 = -69/146$ $-16/3$ $-59/146$ $-27/76$ $-7/26$ $-11/3$ $-39/146$ $-17/76$ $-29/146$	s hom  sum  0 0 0 6 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	with $ r $ $k_0$ -166 -119 -86 -122 -109 -19 -63 -93 -122	Smooth sm class:   = 5, s $k_1$ 38 17 28 4 22 -3 22 46 -2	h struct s of Escl = $-2$ , $l_0$ -154 -76 -53 -113 -72 -12 -32 -92 -113	henburg $p_{1} = 2,$ $l_{1}$ $7$ $-52$ $-34$ $-13$ $-42$ $-12$ $-32$ $34$ $-18$	$\begin{array}{c} \text{g-Kruggel spaces} \\ s_2 = 1/4 \\ \hline s_1 \\ \hline -69/140 \\ -16/35 \\ -59/140 \\ -27/70 \\ -7/20 \\ -11/35 \\ -39/140 \\ -17/70 \\ -29/140 \end{array}$
sum  -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1	with $ r $ $k_0$ 56  46  72  36  37  82  56  6  96  95	$ \sin c  \cos c \cos c \cos c \cos c \cos c \cos c \cos c \cos c \cos c $	s of Esc s = -2, $l_0$ 45 35 65 35 65 55 65 56	henburg: $p_1 = 2$ , $l_1$ 19 15 35 -11 9 39 -11 -1 35 42	a  -Kruggel space: $s_2 = 1/6$ $s_1$ -69/14( -16/3; -59/14( -27/7( -7/2( -11/3; -39/14( -17/7( -29/14( -6/3;	s home sum 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	with $ r $ $k_0$ -166 -119 -86 -122 -109 -19 -63 -93 -122 -18	Smooth sm class:   = 5, s $k_1$ 38 17 28 4 22 -3 22 46 -2 7	h struct s of Escl = $-2$ , $l_0$ -154 -76 -53 -113 -72 -12 -32 -92 -113 -12	henburg $p_1 = 2$ , $l_1$ 7  -52  -34  -13  -42  -12  -32  34  -18  -6	$\begin{array}{c} \text{g-Kruggel spaces} \\ s_2 = 1/4 \\ \hline s_1 \\ -69/140 \\ -16/35 \\ -59/140 \\ -27/70 \\ -7/20 \\ -11/35 \\ -39/140 \\ -17/70 \\ -29/140 \\ -6/35 \\ \end{array}$
sum  -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1	with $ r $ $k_0$ 56  46  72  36  37  82  56  6  96	$ sm class  = 5, s = \frac{k_1}{k_1}$	s of Esc s = -2, $l_0$ 45 35 65 35 65 55 65	henburg: $p_1 = 2$ , $l_1$ 19 15 35 -11 9 39 -11 -1 35	a -Kruggel spaces $s_2 = 1/6$ $s_3 = -69/146$ $-16/3$ $-59/146$ $-27/76$ $-7/26$ $-11/3$ $-39/146$ $-17/76$ $-29/146$	s hom  sum  0 0 0  0 0	with $ r $ $k_0$ -166 -119 -86 -122 -109 -19 -63 -93 -122	Smooth sm class:   = 5, s $k_1$ 38 17 28 4 22 -3 22 46 -2	h struct s of Escl = $-2$ , $l_0$ -154 -76 -53 -113 -72 -12 -32 -92 -113	henburg $p_1 = 2$ , $l_1$ 7 -52 -34 -13 -42 -12 -32 -34 -16 -6 -26	$\begin{array}{c} \text{g-Kruggel spaces} \\ s_2 = 1/4 \\ \hline s_1 \\ \hline -69/140 \\ -16/35 \\ -59/140 \\ -27/70 \\ -7/20 \\ -11/35 \\ -39/140 \\ -17/70 \\ -29/140 \end{array}$
sum  -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1	with $  r  _{k_0}$ 56 46 72 36 37 82 56 6 96 95 66	$\begin{array}{c} \text{sm clas} \\   = 5, s \\ \hline k_1 \\ \hline \\ 2 \\ -3 \\ 26 \\ -18 \\ 6 \\ 16 \\ -14 \\ -3 \\ -19 \\ -25 \\ 37 \end{array}$	s of Esc s = -2, $l_0$ 45 35 65 35 65 55 5 65 5 65 5 65 5 65 5 65 5 65 5 5 6 5 5 6 5 5 6 5 5 5 6 5 5 5 5 5 6 5 5 5 5 5 5 5 5	henburg: $p_1 = 2$ , $l_1$ 19 15 35 -11 9 39 -11 -1 35 42 45	a  -Kruggel spaces $s_2 = 1/6$ $s_1$ -69/14( -16/38 -59/14( -27/7( -7/26 -11/38 -39/14( -17/76 -29/14( -6/38 -19/14(	s hom    sum   0	with $ r $ $k_0$ -166 -119 -86 -122 -109 -19 -63 -93 -122 -18 -53	Smooth sm class; $  = 5, s = 100$ $  = 5, s = 100$ $  =$	h structs of Esci = $-2$ , $l_0$ -154 -76 -53 -113 -72 -12 -32 -92 -113 -12 -32	henburg $p_1 = 2$ , $l_1$ 7  -52  -34  -13  -42  -12  -32  34  -18  -6	$\begin{array}{c} \text{x-Kruggel spaces} \\ s_2 = 1/4 \\ \hline s_1 \\ \hline -69/140 \\ -16/35 \\ -59/140 \\ -27/70 \\ -7/20 \\ -11/35 \\ -39/140 \\ -17/70 \\ -29/140 \\ -6/35 \\ -19/140 \end{array}$
sum  -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1	with $ 7 $ 56  46  72  36  37  82  56  6  95  66  26  42  19	sm clas $  = 5, s  $ $k_1$ 2  -3  26  -18  6  16  -14  -3  -19  -25  37  -3  21  -5	s of Escs $= -2$ , $l_0$ 45 35 65 55 65 56 56 59 25 35 16	henburg: $p_1 = 2$ , $\frac{l_1}{l_1}$ 19 15 35 -11 9 9 -11 -1 35 42 45 -1 29 2	a -Kruggel spaces $s_2 = 1/6$ $s_1$ $-69/144$ $-16/38$ $-59/144$ $-27/76$ $-7/26$ $-11/38$ $-39/144$ $-17/76$ $-29/144$ $-1/14$ $-1/14$ $-1/14$ $-1/38$	s hom  sum  0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	$\begin{array}{c} \text{with }   r \\ k_0 \\ \hline \\ -166 \\ -119 \\ -86 \\ -122 \\ -109 \\ -19 \\ -63 \\ -93 \\ -122 \\ -18 \\ -53 \\ -82 \\ -82 \\ -74 \\ \end{array}$	Smooth sm class $ =5, s$ $k_1$ $ =5, s$ $k_1$ $ =5, s$ $k_1$ $ =5, s$ $ =5$	h structs of Esci = $-2$ , $l_0$ -154 -76 -53 -113 -72 -12 -32 -92 -113 -72 -74 -74	henburg $p_1 = 2$ , $l_1$ 7  -52 -34 -13 -42 -12 -32 -34 -18 -6 -26 -33 -29 -18	$\begin{array}{l} \text{g-Kruggel spaces} \\ s_2 = 1/4 \\ \hline s_1 \\ \hline -69/140 \\ -16/35 \\ -59/140 \\ -27/70 \\ -7/20 \\ -11/35 \\ -39/140 \\ -17/70 \\ -29/140 \\ -6/35 \\ -19/140 \\ -1/10 \\ -9/140 \\ -1/35 \\ \end{array}$
sum  -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1	with $ 7 $ 56  46  72  36  37  82  56  6  95  66  26  42  19  77	sm clas $ \cdot  = 5$ , $\epsilon$ $k_1$ 2 -3 26 -18 6 16 -14 -3 -19 -25 37 -3 21 -5 -34	s of Escs $s = -2$ , $l_0$ 45  35  65  35  65  55  65  59  25  35  16  69	henburg: $p_1 = 2$ , $\frac{l_1}{l_1}$ 19  15  35  -11  9  31  -11  -1  35  42  45  -1  29  -5	a -Kruggel spaces $s_2 = 1/6$ $s_1$ $-69/144$ $-16/38$ $-59/144$ $-27/76$ $-7/26$ $-11/38$ $-39/144$ $-6/38$ $-19/144$ $-6/38$ $-19/144$ $-1/16$ $-9/144$ $-1/16$ $-1/18$ $-1/18$ $-1/18$	s home sum  0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	$\begin{array}{c} \text{with }  r\\ k_0\\ \hline \\ -166\\ -119\\ -86\\ -122\\ -109\\ -19\\ -63\\ -93\\ -122\\ -18\\ -53\\ -82\\ -82\\ -82\\ -74\\ -209\\ \end{array}$	Smooth sm class   = 5, s   $k_1$   38   17   28   4   22   46   -2   27   6   6   27   102   102   102   102   102   102   102   103   10	h struct s of Escl = $-2$ , $\frac{1}{l_0}$ -154 -76 -53 -113 -12 -32 -12 -12 -32 -12 -32 -74 -73 -72 -12 -12	henburg $p_1 = 2$ , $l_1$ 7  -52 -34 -13 -42 -12 -32 -34 -18 -6 -26 -33 -29 -18 -86	$\begin{array}{c} \text{g-Kruggel spaces} \\ s_2 = 1/4 \\ \hline s_1 \\ \hline \\ -69/140 \\ -16/35 \\ -59/140 \\ -27/70 \\ -7/20 \\ -11/35 \\ -39/140 \\ -17/70 \\ -29/140 \\ -6/35 \\ -19/140 \\ -1/10 \\ -9/140 \\ -1/35 \\ 1/140 \\ \end{array}$
sum  -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1	with $ 7 $ 56  46  72  36  37  82  56  96  95  66  26  42  19  77  36	$\begin{array}{c} \text{sm clas} \\  =5, s \\ k_1 \\ \hline \\ 2 \\ -3 \\ 26 \\ -18 \\ 6 \\ 6 \\ -14 \\ -3 \\ -19 \\ -25 \\ 37 \\ -3 \\ 21 \\ -5 \\ -34 \\ -3 \\ -3 \\ -3 \\ -3 \\ -3 \\ -3 \\ -$	s of Escs $s = -2$ , $l_0$ 45  35  65  35  65  5  65  5  65  5  65  6	henburg: $p_1 = 2$ , $\frac{l_1}{l_1}$ 19 15 35 -11 9 39 -11 -1 35 42 45 -1 29 2 -5 -1	a  -Kruggel space: $s_2 = 1/6$ $s_1$ -69/14( -16/3; -59/14( -27/7( -7/2( -11/3; -39/14( -17/7( -29/14( -1/16( -1/16( -1/3; 1/144( 3/7( 3/7( -1/16( -1/3;	s home sum 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	$\begin{array}{c} \text{with }  r\\ k_0 \end{array}$ $\begin{array}{c} -166\\ -119\\ -86\\ -122\\ -109\\ -63\\ -93\\ -122\\ -18\\ -53\\ -82\\ -74\\ -209\\ -69 \end{array}$	Smooth S	h structs of Escleration of Esclera	henburg $p_1 = 2$ , $l_1$ 7 -52 -34 -13 -42 -12 -32 -34 -18 -6 -26 -26 -33 -29 18 -86 -22	$\begin{array}{c} \text{g-Kruggel spaces} \\ s_2 = 1/4 \\ \hline s_1 \\ \hline -69/140 \\ -16/35 \\ -59/140 \\ -27/70 \\ -7/20 \\ -11/35 \\ -39/140 \\ -17/70 \\ -29/140 \\ -6/35 \\ -19/140 \\ -1/10 \\ -9/140 \\ -1/35 \\ 1/140 \\ 3/70 \\ \end{array}$
sum  -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1	$\begin{array}{c} \text{with} \   r \\ \hline k_0 \\ \hline \\ 56 \\ 46 \\ 72 \\ 36 \\ 37 \\ 82 \\ 56 \\ 6 \\ 95 \\ 66 \\ 26 \\ 20 \\ 19 \\ 77 \\ 36 \\ 126 \\ \end{array}$	$\begin{array}{l} \text{sm clas} \\  =5, \ \varepsilon \\ k_1 \\ \hline 2 \\ -3 \\ 26 \\ -18 \\ 6 \\ 16 \\ -14 \\ -3 \\ -19 \\ -25 \\ 37 \\ -3 \\ 21 \\ -5 \\ -34 \\ -3 \\ -43 \\ \end{array}$	s of Escs $s = -2$ , $l_0$ 45  35  65  35  65  55  65  56  59  25  16  69  35  89	$\begin{array}{l} \text{henburg} \\ p_1 = 2, \\ l_1 \\ \hline \\ 19 \\ 15 \\ 35 \\ -11 \\ 9 \\ 39 \\ -11 \\ -11 \\ -1 \\ 35 \\ 42 \\ 45 \\ -1 \\ 29 \\ 2 \\ -5 \\ -1 \\ 35 \\ \end{array}$	a -Kruggel space: $s_2 = 1/6$ $s_1$ $-69/14(-16/38) -59/14(-27/7(-7/26) -11/38 -39/14(-6/38) -19/14(-9/14(-1/38) 1/14(-3/76) 11/14(-3/76) 11/14(-1/38) -11/14(-3/76) 11/14(-3/76) 11/14(-3/76) -1/38 $	s hom  sum  0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	$\begin{array}{c} \text{with }  r\\ k_0 \\ \hline \\ -166\\ -112\\ -86\\ -122\\ -109\\ -63\\ -93\\ -122\\ -18\\ -53\\ -82\\ -18\\ -53\\ -82\\ -74\\ -209\\ -69\\ -113 \\ \end{array}$	Smooth sm class:  =5, s $k_1$ 38 17 28 4 22 -3 22 46 -2 7 6 -22 -16 27 102	h structs of Escision $= -2$ ,	henburg $p_1 = 2$ , $l_1$ 7  -52  -34  -13  -42  -12  -32  -34  -18  -6  -26  -33  -29  18  -86  -22  8	$\begin{array}{l} \text{g-Kruggel spaces} \\ s_2 = 1/4 \\ \hline s_1 \\ \hline \\ -69/140 \\ -16/35 \\ -59/140 \\ -27/70 \\ -7/20 \\ -11/35 \\ -39/140 \\ -17/70 \\ -29/140 \\ -6/35 \\ -19/140 \\ -1/10 \\ -9/140 \\ -1/35 \\ 1/140 \\ 3/70 \\ 11/140 \end{array}$
sum  -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1	with $ 7 $ 56  46  72  36  37  82  56  96  95  66  26  42  19  77  36	$\begin{array}{c} \text{sm clas} \\  =5, s \\ k_1 \\ \hline \\ 2 \\ -3 \\ 26 \\ -18 \\ 6 \\ 6 \\ -14 \\ -3 \\ -19 \\ -25 \\ 37 \\ -3 \\ 21 \\ -5 \\ -34 \\ -3 \\ -3 \\ -3 \\ -3 \\ -3 \\ -3 \\ -$	s of Escs $s = -2$ , $l_0$ 45  35  65  35  65  5  65  5  65  5  65  6	henburg: $p_1 = 2$ , $\frac{l_1}{l_1}$ 19 15 35 -11 9 39 -11 -1 35 42 45 -1 29 2 -5 -1	a -Kruggel spaces $s_2 = 1/6$ $s_1$ $-69/144$ $-16/38$ $-59/144$ $-27/77$ $-7/26$ $-11/38$ $-39/144$ $-6/38$ $-19/144$ $-6/38$ $1/146$ $-1/16$	s home sum  0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	$\begin{array}{c} \text{with }  r\\ k_0 \end{array}$ $\begin{array}{c} -166\\ -119\\ -86\\ -122\\ -109\\ -63\\ -93\\ -122\\ -18\\ -53\\ -82\\ -74\\ -209\\ -69 \end{array}$	Smooth S	h structs of Escleration of Esclera	henburg $p_1 = 2$ , $l_1$ 7 -52 -34 -13 -42 -12 -32 -34 -18 -6 -26 -26 -33 -29 18 -86 -22	$\begin{array}{c} \text{g-Kruggel spaces} \\ s_2 = 1/4 \\ \hline s_1 \\ \hline -69/140 \\ -16/35 \\ -59/140 \\ -27/70 \\ -7/20 \\ -11/35 \\ -39/140 \\ -17/70 \\ -29/140 \\ -6/35 \\ -19/140 \\ -1/10 \\ -9/140 \\ -1/35 \\ 1/140 \\ 3/70 \\ 11/140 \\ 4/35 \\ \end{array}$
sum  -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1	$\begin{array}{c} \text{with} \   r \\ \hline k_0 \\ \hline \\ 56 \\ 46 \\ 672 \\ 36 \\ 37 \\ 82 \\ 56 \\ 6 \\ 95 \\ 66 \\ 26 \\ 42 \\ 19 \\ 77 \\ 36 \\ 126 \\ 55 \\ 21 \\ 25 \\ \end{array}$	$\begin{array}{l} \text{sm clas} \\  =5, \ \varepsilon \\ k_1 \\ \hline \\ 2 \\ -3 \\ 26 \\ -18 \\ 6 \\ -14 \\ -3 \\ -19 \\ -25 \\ 37 \\ -3 \\ 21 \\ -5 \\ -34 \\ -3 \\ -43 \\ -11 \\ 2 \\ -1 \\ \end{array}$	s of Escs $s = -2$ , $l_0$ 45 35 65 55 55 56 59 25 35 16 69 38 39 32 19	$\begin{array}{l} \text{henburg} \\ p_1 = 2, \\ l_1 \\ \hline \\ 19 \\ 15 \\ 35 \\ -11 \\ 9 \\ 39 \\ -11 \\ -1 \\ 35 \\ 42 \\ 45 \\ -1 \\ 29 \\ 2 \\ -5 \\ -1 \\ 35 \\ 26 \\ 5 \\ 6 \end{array}$	a -Kruggel space: $s_2 = 1/6$ $s_1$ $-69/14(-16/38) -59/14(-27/7(-7/26) -11/38 -39/14(-6/38) -19/14(-9/14(-1/38) 1/14(-3/76) 11/14(-3/76) 11/14(-1/38) -11/14(-3/76) 11/14(-3/76) 11/14(-3/76) -1/38 $	s home sum  0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	$\begin{array}{c} \text{with }  r\\ k_0\\ \hline \\ -166\\ -112\\ -109\\ -19\\ -63\\ -93\\ -122\\ -109\\ -63\\ -93\\ -122\\ -18\\ -53\\ -82\\ -74\\ -209\\ -69\\ 9\\ -113\\ -112\\ -98\\ -36\\ \end{array}$	Smooth S	h structs of Escision $= -2.0$ , $= -2.0$ , $= -2.0$ , $= -154$ , $= -76$ , $= -153$ , $= -113$ , $= -72$ , $= -12$ , $= -32$ , $= -74$ , $= -73$ , $= -72$ , $= -122$ , $= -106$ , $= -109$ , $= -92$ , $= -34$	henburg $p_1 = 2$ , $\frac{1}{2}$ $\frac{1}{$	$\begin{array}{l} \text{g-Kruggel spaces} \\ s_2 = 1/4 \\ \hline s_1 \\ \hline \\ -69/140 \\ -16/35 \\ -59/140 \\ -27/70 \\ -7/20 \\ -11/35 \\ -39/140 \\ -17/70 \\ -29/140 \\ -6/35 \\ -19/140 \\ -1/10 \\ -9/140 \\ -1/35 \\ 1/140 \\ 3/70 \\ 11/140 \end{array}$
sum  -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1	$\begin{array}{c} \text{with} \   r \\ \hline k_0 \\ \hline \\ 56 \\ 46 \\ 72 \\ 36 \\ 37 \\ 82 \\ 56 \\ 66 \\ 95 \\ 66 \\ 95 \\ 66 \\ 42 \\ 19 \\ 77 \\ 36 \\ 126 \\ 55 \\ 21 \\ 25 \\ 61 \\ \end{array}$	$\begin{array}{l} \text{sm clas} \\  =5, \ \varepsilon \\ \hline k_1 \\ \hline \\ 2 \\ -3 \\ 26 \\ -18 \\ 6 \\ 16 \\ -14 \\ -3 \\ -19 \\ -25 \\ 37 \\ -3 \\ 21 \\ -5 \\ -34 \\ -3 \\ -11 \\ 2 \\ -1 \\ -28 \\ \end{array}$	$\begin{array}{l} \text{s of Esc} \\ \text{s} = -2, \\ l_0 \\ \hline \\ 45 \\ 35 \\ 65 \\ 55 \\ 65 \\ 55 \\ 65 \\ 56 \\ 59 \\ 25 \\ 35 \\ 16 \\ 69 \\ 35 \\ 19 \\ 21 \\ 55 \\ \\ \end{array}$	henburg: $p_1 = 2$ , $l_1$ 19 15 35 -11 9 39 -11 -1 35 42 -5 -1 29 5 6 -5	a -Kruggel spaces $s_2 = 1/6$ $s_1$ $-69/144$ $-16/38$ $-59/144$ $-27/77$ $-7/26$ $-11/38$ $-39/144$ $-6/38$ $-19/144$ $-6/38$ $1/144$ $3/76$ $1/144$ $3/76$ $1/144$ $3/3$ $3/22$ $13/76$ $31/144$	s home sum  0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	$\begin{array}{c} \text{with }   r \\ k_0 \\ \hline \\ -166 \\ -119 \\ -86 \\ -122 \\ -109 \\ -63 \\ -93 \\ -122 \\ -18 \\ -53 \\ -82 \\ -82 \\ -82 \\ -84 \\ -209 \\ -69 \\ -113 \\ -112 \\ -98 \\ -36 \\ -72 \\ \end{array}$	Smooth Smooth Sm class   = 5, s	h struct s of Esci = $-2$ , $l_0$ -154 -76 -53 -113 -72 -12 -32 -92 -113 -12 -32 -74 -73 -72 -122 -22 -122 -106 -109	henburg $p_1 = 2$ , $l_1$ -52 -34 -13 -42 -12 -32 -34 -18 -6 -26 -26 -29 -18 -86 -22 -37 -33	$\begin{array}{c} \text{g-Kruggel spaces} \\ s_2 = 1/4 \\ \hline \\ s_1 \\ \hline \\ -69/140 \\ -16/35 \\ -59/140 \\ -27/70 \\ -7/20 \\ -11/35 \\ -39/140 \\ -17/70 \\ -29/140 \\ -6/35 \\ -19/140 \\ -1/10 \\ -9/140 \\ -1/35 \\ 1/140 \\ 3/70 \\ 11/140 \\ 4/35 \\ 3/20 \\ 13/70 \\ 31/140 \\ \end{array}$
sum  -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1	$\begin{array}{c} \text{with} \   r \\ \hline \\ k_0 \\ \hline \\ 56 \\ 46 \\ 72 \\ 36 \\ 37 \\ 82 \\ 56 \\ 66 \\ 95 \\ 66 \\ 42 \\ 19 \\ 77 \\ 36 \\ 126 \\ 55 \\ 21 \\ 25 \\ 61 \\ 21 \\ \end{array}$	$\begin{array}{l} \text{sm clas} \\  =5, \ \varepsilon \\ k_1 \\ \hline 2 \\ -3 \\ 26 \\ -18 \\ 6 \\ 16 \\ -14 \\ -3 \\ -19 \\ -25 \\ 37 \\ -3 \\ 21 \\ -5 \\ -3 \\ 43 \\ -11 \\ 2 \\ -11 \\ -28 \\ -8 \\ \end{array}$	s of Escs $s = -2$ , $l_0$ 45 35 65 35 65 55 65 56 59 225 35 16 69 35 89 31 19 21 21 515	henburg: $p_1 = 2$ , $l_1$ 19 15 35 -11 9 39 -11 -1 35 42 45 -1 29 2 -5 -1 35 6 -5 5	a -Kruggel space: $s_2 = 1/6$ $s_1$ $-69/146$ $-16/33$ $-59/146$ $-27/76$ $-7/26$ $-11/33$ $-39/146$ $-17/76$ $-9/146$ $-1/16$	s home sum  0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	$\begin{array}{c} \text{with }   r \\ k_0 \\ \hline \\ -166 \\ -119 \\ -86 \\ -122 \\ -109 \\ -63 \\ -93 \\ -122 \\ -18 \\ -53 \\ -82 \\ -74 \\ -209 \\ -69 \\ -113 \\ -112 \\ -98 \\ -36 \\ -72 \\ -26 \\ \end{array}$	$\begin{array}{c} \text{Smooth} \\ \text{sm class} \\ \text{class} \\ \text{l} = 5,  s \\ k_1 \\ 38 \\ 17 \\ 28 \\ 4 \\ 22 \\ -3 \\ 22 \\ 46 \\ -22 \\ -16 \\ 27 \\ 7 \\ 102 \\ 7 \\ 27 \\ 102 \\ 11 \\ 18 \\ -6 \\ -2 \\ \end{array}$	h structs of Escision $= -2$ ,	henburg $p_1 = 2$ , $l_1$ 7  -52  -34  -13  -42  -12  -32  -34  -18  -6  -26  -28  -29  18  -86  -22  7  -33  -13	$\begin{array}{c} \text{g-Kruggel spaces} \\ s_2 = 1/4 \\ \hline \\ s_1 \\ \hline \\ -69/140 \\ -16/35 \\ -59/140 \\ -27/70 \\ -7/20 \\ -11/35 \\ -39/140 \\ -17/70 \\ -29/140 \\ -6/35 \\ -19/140 \\ -1/10 \\ -9/140 \\ -1/35 \\ 1/140 \\ 3/70 \\ 11/140 \\ 4/35 \\ 3/20 \\ 13/70 \\ 31/140 \\ 9/35 \\ \end{array}$
sum  -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1	$\begin{array}{c} \text{with} \   r \\ \hline \\ k_0 \\ \hline \\ \\ 56 \\ 46 \\ 72 \\ 36 \\ 37 \\ 82 \\ 56 \\ 6 \\ 6 \\ 95 \\ 66 \\ 26 \\ 42 \\ 19 \\ 77 \\ 36 \\ 126 \\ 55 \\ 21 \\ 25 \\ 61 \\ 21 \\ 79 \\ \end{array}$	$\begin{array}{c} \text{sm clas} \\  =5, \ \varepsilon \\ \hline k_1 \\ 2 \\ -3 \\ 26 \\ 6 \\ -18 \\ 6 \\ -14 \\ -3 \\ -19 \\ -25 \\ 37 \\ -3 \\ 21 \\ -5 \\ -34 \\ -3 \\ -11 \\ 2 \\ -1 \\ -28 \\ -8 \\ -35 \\ \end{array}$	$\begin{array}{c} \text{s of Esc} \\ \text{s} = -2, \\ l_0 \\ \\ \hline \\ 45 \\ 35 \\ 65 \\ \\ 55 \\ \\ 55 \\ \\ 55 \\ \\ \\ 55 \\ \\ \\ 55 \\ \\ \\ 55 \\ \\ \\ 55 \\ \\ \\ \\ 55 \\$	$\begin{array}{l} \text{henburg} \\ p_1 = 2, \\ l_1 \\ \hline \\ 19 \\ 15 \\ 35 \\ -11 \\ 9 \\ 39 \\ -11 \\ -1 \\ 35 \\ 45 \\ -1 \\ 35 \\ 45 \\ -1 \\ 35 \\ 6 \\ -5 \\ 5 \\ -19 \\ \end{array}$	a -Kruggel space: $s_2 = 1/6$ $s_1$ $-69/144$ $-16/38$ $-59/144$ $-27/77$ $-7/22$ $-11/38$ $-39/144$ $-17/76$ $-29/144$ $-1/38$ $-19/144$ $-1/38$ $1/144$ $4/38$ $3/22$ $13/76$ $31/144$ $9/38$ $41/144$	s home sum  0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	$\begin{array}{c} \text{with }  r\\ k_0 \\ \hline \\ -166\\ -112\\ -86\\ -122\\ -109\\ -63\\ -93\\ -122\\ -18\\ -53\\ -82\\ -74\\ -209\\ -69\\ -113\\ -112\\ -98\\ -69\\ -113\\ -112\\ -98\\ -69\\ -72\\ -26\\ -76\\ -76\\ -76\\ -76\\ -76\\ -76\\ -76\\ -7$	Smooth S	h structs of Escience $= -2, 0$ and $= -2, $	henburg $p_1 = 2$ , $\frac{1}{l_1}$	$\begin{array}{l} \text{g-Kruggel spaces} \\ s_2 = 1/4 \\ \hline s_1 \\ \hline \\ -69/140 \\ -16/35 \\ -59/140 \\ -27/70 \\ -7/20 \\ -11/35 \\ -39/140 \\ -17/70 \\ -29/140 \\ -6/35 \\ -19/140 \\ -9/140 \\ -1/10 \\ -9/140 \\ -1/35 \\ 1/140 \\ 3/70 \\ 11/140 \\ 4/35 \\ 3/20 \\ 13/70 \\ 31/140 \\ 9/35 \\ 41/140 \end{array}$
sum  -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1	$\begin{array}{c} \text{with} \   r \\ \hline \\ k_0 \\ \hline \\ 56 \\ 46 \\ 72 \\ 36 \\ 37 \\ 82 \\ 56 \\ 66 \\ 95 \\ 66 \\ 42 \\ 19 \\ 77 \\ 36 \\ 126 \\ 55 \\ 21 \\ 25 \\ 61 \\ 21 \\ \end{array}$	$\begin{array}{l} \text{sm clas} \\  =5, \ \varepsilon \\ k_1 \\ \hline 2 \\ -3 \\ 26 \\ -18 \\ 6 \\ 16 \\ -14 \\ -3 \\ -19 \\ -25 \\ 37 \\ -3 \\ 21 \\ -5 \\ -3 \\ 43 \\ -11 \\ 2 \\ -11 \\ -28 \\ -8 \\ \end{array}$	s of Escs $s = -2$ , $l_0$ 45 35 65 35 65 55 65 56 59 225 35 16 69 35 89 31 19 21 21 515	henburg: $p_1 = 2$ , $l_1$ 19 15 35 -11 9 39 -11 -1 35 42 45 -1 29 2 -5 -1 35 6 -5 5	a -Kruggel space: $s_2 = 1/6$ $s_1$ $-69/146$ $-16/33$ $-59/146$ $-27/76$ $-7/26$ $-11/33$ $-39/146$ $-17/76$ $-9/146$ $-1/16$	s hom  sum  0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	$\begin{array}{c} \text{with }   r \\ k_0 \\ \hline \\ -166 \\ -119 \\ -86 \\ -122 \\ -109 \\ -63 \\ -93 \\ -122 \\ -18 \\ -53 \\ -82 \\ -74 \\ -209 \\ -69 \\ -113 \\ -112 \\ -98 \\ -36 \\ -72 \\ -26 \\ \end{array}$	Smooth Smooth Sm class   = 5, s	h struct s of Esci = $-2$ , $l_0$ -154 -76 -53 -113 -72 -12 -32 -92 -113 -12 -32 -74 -73 -72 -122 -32 -122 -106 -109	henburg $p_1 = 2$ , $l_1$ 7  -52  -34  -13  -42  -12  -32  -34  -18  -6  -26  -28  -29  18  -86  -22  7  -33  -13	$\begin{array}{c} \text{g-Kruggel spaces} \\ s_2 = 1/4 \\ \hline s_1 \\ \hline -69/140 \\ -16/35 \\ -59/140 \\ -27/70 \\ -7/20 \\ -11/35 \\ -39/140 \\ -17/70 \\ -29/140 \\ -6/35 \\ -19/140 \\ -1/10 \\ -9/140 \\ -1/35 \\ 1/140 \\ 3/70 \\ 11/140 \\ 4/35 \\ 3/20 \\ 13/70 \\ 31/140 \\ 9/35 \\ \end{array}$
sum  -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1	with $ 7 $ 56  46  46  72  36  37  82  56  96  95  42  19  77  36  126  55  21  21  79  141	$\begin{array}{l} \text{sm clas} \\  =5, \ \varepsilon \\ \hline k_1 \\ 2 \\ -3 \\ 26 \\ 6 \\ -18 \\ 6 \\ -14 \\ -3 \\ -19 \\ -25 \\ 37 \\ -3 \\ 21 \\ -5 \\ -34 \\ -3 \\ -43 \\ -11 \\ 22 \\ -8 \\ -8 \\ -44 \\ -15 \\ -8 \\ -8 \\ -8 \\ -8 \\ -8 \\ -8 \\ -8 \\ -$	$\begin{array}{l} \text{s of Esc} \\ \text{s} = -2, \\ l_0 \\ \hline \\ 45 \\ 35 \\ 65 \\ 55 \\ 55 \\ 55 \\ 55 \\ 55 \\ 5$	$\begin{array}{l} \text{henburg} \\ p_1 = 2, \\ l_1 \\ \hline \\ 19 \\ 15 \\ 35 \\ -11 \\ 9 \\ 39 \\ -11 \\ -11 \\ -1 \\ 35 \\ 44 \\ -11 \\ 22 \\ 2 \\ -5 \\ -19 \\ 66 \\ -5 \\ 5 \\ -19 \\ 69 \\ 12 \\ -5 \\ \end{array}$	a -Kruggel space: $s_2 = 1/6$ $s_1$ $-69/144$ $-16/38$ $-59/144$ $-27/70$ $-7/20$ $-11/38$ $-39/144$ $-6/38$ $-19/144$ $-6/38$ $-19/144$ $-1/14$ $-1/144$	s home sum  0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	$\begin{array}{c} \text{with }   r \\ k_0 \\ \hline \\ -166 \\ -119 \\ -86 \\ -122 \\ -109 \\ -63 \\ -93 \\ -122 \\ -18 \\ -53 \\ -82 \\ -82 \\ -74 \\ -209 \\ -69 \\ -113 \\ -112 \\ -98 \\ -36 \\ -72 \\ -22 \\ -26 \\ -72 \\ -23 \\ \end{array}$	Smooth S	h structs of Escience $= -2, 0$ and $= -2, $	henburg $p_1=2$ , $\frac{1}{l_1}$ $\frac{1}{l_1}$ $\frac{1}{l_1}$ $\frac{1}{l_2}$	$\begin{array}{c} \text{g-Kruggel spaces} \\ s_2 = 1/4 \\ \hline \\ s_1 \\ \hline \\ -69/140 \\ -16/35 \\ -59/140 \\ -27/70 \\ -7/20 \\ -11/35 \\ -39/140 \\ -17/70 \\ -29/140 \\ -6/35 \\ -19/140 \\ -1/10 \\ -9/140 \\ -1/10 \\ -9/140 \\ -1/35 \\ 1/140 \\ 3/70 \\ 11/140 \\ 4/35 \\ 3/20 \\ 13/70 \\ 31/140 \\ 9/35 \\ 41/140 \\ 23/70 \\ \end{array}$
sum  -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1	$\begin{array}{c} \text{with} \mid r \\ \hline k_0 \\ \hline \\ 56 \\ 46 \\ 72 \\ 36 \\ 37 \\ 82 \\ 56 \\ 66 \\ 95 \\ 66 \\ 42 \\ 19 \\ 77 \\ 36 \\ 126 \\ 55 \\ 21 \\ 25 \\ 19 \\ 41 \\ 15 \\ 9 \\ 141 \\ 59 \\ \end{array}$	$\begin{array}{l} \text{sm clas} \\  =5, \ \varepsilon \\ \hline k_1 \\ 2 \\ -3 \\ 26 \\ 6 \\ -18 \\ 6 \\ -14 \\ -3 \\ -19 \\ -25 \\ 37 \\ -3 \\ 21 \\ -5 \\ -34 \\ -3 \\ -43 \\ -11 \\ 22 \\ -8 \\ -8 \\ -44 \\ -15 \\ -8 \\ -8 \\ -8 \\ -8 \\ -8 \\ -8 \\ -8 \\ -$	$\begin{array}{l} \text{s of Esc} \\ \text{s} = -2, \\ l_0 \\ \hline \\ 45 \\ 35 \\ 65 \\ 55 \\ 65 \\ 55 \\ 65 \\ 56 \\ 59 \\ 25 \\ 35 \\ 16 \\ 69 \\ 35 \\ 16 \\ 69 \\ 32 \\ 19 \\ 21 \\ 55 \\ 15 \\ 6 \\ 76 \\ 6 \\ 75 \\ 46 \\ 25 \\ 129 \\ \end{array}$	henburg: $p_1 = 2$ , $l_1$ 19 15 35 -11 9 39 -11 -1 35 42 45 -1 29 2 -5 -1 35 6 5 6 -5 5 -1 19 12	a -Kruggel space: $s_2 = 1/6$ $s_1$ $-69/146$ $-16/33$ $-59/146$ $-27/76$ $-7/22$ $-11/33$ $-39/146$ $-17/76$ $-9/146$ $-1/33$ $-19/146$ $-1/33$ $1/144$ $4/32$ $3/76$ $11/146$ $4/32$ $13/76$ $31/144$ $9/33$ $41/146$ $23/76$ $51/146$	s hom  sum  0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	$\begin{array}{c} \text{with }   r \\ k_0 \\ \hline \\ -166 \\ -119 \\ -86 \\ -122 \\ -109 \\ -63 \\ -122 \\ -18 \\ -53 \\ -82 \\ -74 \\ -209 \\ -69 \\ -113 \\ -112 \\ -98 \\ -36 \\ -72 \\ -26 \\ -76 \\ -23 \\ -74 \\ -29 \\ -113 \\ -112 \\ -114 \\$	$\begin{array}{c} \text{Smooth} \\ \text{sm class} \\  =5, s \\ k_1 \\ 38 \\ 17 \\ 28 \\ 4 \\ 22 \\ -3 \\ 322 \\ 46 \\ -22 \\ -16 \\ 27 \\ 7 \\ 6 \\ -22 \\ -16 \\ 27 \\ 102 \\ 7 \\ 27 \\ 102 \\ -1 \\ 8 \\ -6 \\ -2 \\ 8 \\ 6 \\ 38 \\ \end{array}$	h structs of Escience $\frac{1}{2}$ of Escience	henburg $p_1 = 2$ , $l_1$ 7  -52  -34  -13  -42  -12  -32  -34  -18  -6  -26  -23  -29  18  -86  -22  8  7  -2  7  -33  -13  -23  -13  -23  -17  -23	$\begin{array}{c} \text{g-Kruggel spaces} \\ s_2 = 1/4 \\ \hline s_1 \\ \hline \\ -69/140 \\ -16/35 \\ -59/140 \\ -27/70 \\ -7/20 \\ -11/35 \\ -39/140 \\ -17/70 \\ -29/140 \\ -6/35 \\ -19/140 \\ -6/35 \\ -19/140 \\ -1/10 \\ -9/140 \\ -1/35 \\ 1/140 \\ 3/70 \\ 11/140 \\ 4/35 \\ 3/20 \\ 13/70 \\ 31/140 \\ 9/35 \\ 41/140 \\ 23/70 \\ 51/140 \\ \end{array}$

Table 7, continued from previous page

Smooth structures on a homeomorphism class of Eschenburg-Kruggel spaces with $ r  = 5$ , $s = -2$ , $p_1 = 2$ , $s_2 = 1/3$ with $ r  = 5$ , $s = -2$ , $p_1 = 2$ , $s_2 = 5/12$ with $ r  = 5$ , $s = -2$ , $p_1 = 2$ , $s_2 = 5/12$ sing   $s_1 = 100$   $s_1 = 100$   $s_2 = 100$   $s_1 = 100$   $s_2 = 100$   $s_3 = 10$			~			Table 7, continued f	ioni prev	ious pag			_	
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$\begin{array}{cccccccccccccccccccccccccccccccccccc$	sum	omorphis with $ r  = k_0$	sm class = $5, s = k_1$	s of Esch = $-1$ , $p_1$ $l_0$	henburg- $l_1 = -2$ , $l_1$	Kruggel spaces $s_2 = 1/60$ $s_1$	sum	with $ r  k_0$	ism cla $  = 5, s$ $k_1$	ss of E $= -1$ ,	schenber $p_1 = -\frac{1}{l}$	urg-Kruggel spaces $-2$ , $s_2 = 1/10$ $l_1$ $s_1$
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$\begin{array}{cccccccccccccccccccccccccccccccccccc$	sum -1 -1 -1 -1	omorphis with $ r  = \frac{k_0}{41}$ $\begin{array}{r} 41 & - \\ 92 & - \\ 87 & - \end{array}$	sm class = $5, s = \frac{k_1}{k_1}$ -11 -28 -30	s of Esch = $-1$ , $p_1$ $l_0$ 40 69 49	henburg- $l_1 = -2, l_1$ $-8$ $21$ $39$	Kruggel spaces $s_2 = 1/60$ $\begin{array}{r} s_1 \\ \hline -131/280 \\ -121/280 \\ -111/280 \end{array}$	0 0 0	with $ r  k_0$ $-24$ $-126$ $-26$	= 5, s $  = 5, s$ $  = 6, s$	ss of E = -1, $\frac{1}{6}$ -1 -9 -2	schenberger $p_1 = -\frac{1}{l_0}$ $\frac{1}{l_0}$	urg-Kruggel spaces $-2$ , $s_2 = 1/10$ $t_1$ $s_1$ $t_2$ $t_3$ $t_4$ $t_5$ $t_6$ $t_7$ $t_8$ $t_$
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$\begin{array}{cccccccccccccccccccccccccccccccccccc$	sum  -1 -1 -1 -1 -1 -1	omorphis with $ r  = \frac{k_0}{41} - \frac{92}{87} - \frac{19}{129} - \frac{1}{129}$	sm class = $5$ , $s$ = $k_1$ -11 -28 -30 -9	s of Escl = $-1$ , $p_1$ $l_0$ 40 69 49 15 122 $-$	henburg- $l_1 = -2, = l_1$ $-8$ $21$ $39$ $2$ $-18$	Kruggel spaces $s_2 = 1/60$ $s_1$ $-131/280$ $-121/280$ $-111/280$ $-101/280$ $-13/40$	0 0 0 0 0 0	with $ r  k_0$ $-24$ $-126$ $-26$ $-69$ $-46$	$\begin{array}{c} \text{nism cla} \\   = 5, \ s \\ k_1 \\ \hline \\ -9 \\ -38 \\ 12 \\ 21 \\ 4 \end{array}$	ss of E = $-1$ , -1 -9 -2 -5 -3	$p_1 = -\frac{1}{l_0}$ $p_2 = -\frac{1}{l_0}$ $p_3 = -\frac{1}{l_0}$ $p_4 = -\frac{1}{l_0}$ $p_5 = -\frac{1}$	$ \begin{array}{llllllllllllllllllllllllllllllllllll$
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	sum  -1 -1 -1 -1 -1 -1 -1	omorphis with $ r  = \frac{k_0}{41} - \frac{92}{87} - \frac{19}{129} - \frac{99}{99}$	sm class = $5$ , $s = k_1$ -11 -28 -30 -9 -41	s of Escl = $-1$ , $p_1$ $l_0$ 40 69 49 15 122 $-62$	henburg- $l_1 = -2, s$ $l_1$ -8 21 39 2 -18 47		sum 0 0 0 0 0 0 0 0 0 0	with $ r  k_0$ $-24$ $-126$ $-26$ $-69$ $-46$ $-47$	$\begin{array}{c} \text{nism cla} \\   = 5, \ s \\ k_1 \\ \hline \\ -9 \\ -38 \\ 12 \\ 21 \\ 4 \\ 16 \end{array}$	ss of E $= -1,$ $-1$ $-9$ $-2$ $-5$ $-3$	$p_1 = -\frac{1}{0}$ $p_1 $	$\begin{array}{lll} \text{urg-Kruggel spaces} \\ -2,  s_2 = 1/10 \\ t_1 & s_1 \\ \hline t_6 & -131/280 \\ t_7 & -121/280 \\ 3 & -111/280 \\ -6 & -101/280 \\ -9 & -13/40 \\ 12 & -81/280 \\ \end{array}$
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	sum  -1 -1 -1 -1 -1 -1 -1 -1 -1	omorphis with $ r  = \frac{k_0}{k_0}$ 41 - 92 - 87 - 19 129 - 99 91 -	sm class = $5$ , $s = k_1$ -11 -28 -30 -9 -41 -9	s of Escl = $-1$ , $p_1$ $l_0$ 40 69 49 15 122 $-6290$ $-$	henburg- $l_1 = -2, s$ $l_1$ -8 2 18 47 33	Kruggel spaces $s_2 = 1/60$ $\begin{array}{r} s_1 \\ \hline -131/280 \\ -121/280 \\ -111/280 \\ -101/280 \\ -13/40 \\ -81/280 \\ -71/280 \\ \end{array}$	sum 0 0 0 0 0 0 0 0 0 0 0 0 0 0	with $ r $ $k_0$ $-24$ $-126$ $-26$ $-69$ $-46$ $-47$ $-118$	$\begin{array}{c} \text{ ism cla} \\  =5, s \\ k_1 \\ \hline -9 \\ -38 \\ 12 \\ 21 \\ 4 \\ 16 \\ -6 \end{array}$	ss of E $= -1,$ $-1$ $-9$ $-2$ $-5$ $-3$ $-4$	schenberger $p_1 = -\frac{1}{l_0}$ $p_2 = -\frac{1}{l_0}$ $p_3 = -\frac{1}{l_0}$ $p_4 = -\frac{1}{l_0}$	$\begin{array}{lll} \text{urg-Kruggel spaces} \\ -2,  s_2 = 1/10 \\ t_1 & s_1 \\ \hline t_6 & -131/280 \\ 72 & -121/280 \\ 3 & -111/280 \\ -6 & -101/280 \\ -9 & -13/40 \\ 12 & -81/280 \\ 29 & -71/280 \\ \end{array}$
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	sum  -1 -1 -1 -1 -1 -1 -1 -1 -1 -1	omorphis with $ r  = \frac{k_0}{k_0}$ 41 - 92 - 87 - 19 129 - 99 91 - 47	sm class = $5$ , $s = k_1$ -11 -28 -30 -9 -41 -9 -41	s of Escl = $-1$ , $p_1$ $l_0$ 40 69 49 15 122 $-6290$ $-29$	henburg- $l_1 = -2, s$ $l_1$ -8 2 18 47 33 2 2		sum  0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	with $ r $ $k_0$ $-24$ $-126$ $-26$ $-69$ $-46$ $-47$ $-118$ $-68$ $-97$	$\begin{array}{c} \text{ lism cla} \\  =5, s \\ k_1 \\ \hline -9 \\ -38 \\ 12 \\ 21 \\ 4 \\ 16 \\ -6 \\ 14 \\ 41 \end{array}$	ss of E = -1,  -1 -9 -2 -5 -3 -4 -10 -6	schenberger $p_1 = -\frac{1}{l_0}$ $p_2 = -\frac{1}{l_0}$ $p_2 = -\frac{1}{l_0}$ $p_1 = -\frac{1}{l_0}$ $p_2 = -\frac{1}{l_0}$ $p_2 = -\frac{1}{l_0}$ $p_3 = -\frac{1}{l_0}$ $p_4 = -\frac{1}{l_0}$ $p_5 = -\frac{1}{l_0}$	$\begin{array}{lll} \text{urg-Kruggel spaces} \\ -2,  s_2 = 1/10 \\ t_1 & s_1 \\ t_6 & -131/280 \\ 22 & -121/280 \\ 3 & -111/280 \\ -6 & -101/280 \\ -9 & -13/40 \\ 12 & -81/280 \\ 29 & -71/280 \\ 21 & -61/280 \\ 11 & -61/280 \\ \end{array}$
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	sum  -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1	omorphis with $ r  = \frac{k_0}{k_0}$ 41 - 92 - 19 129 - 99 91 - 47 22 80 -	sm class = $5$ , $s = \frac{k_1}{k_1}$ = $-11$ = $-28$ = $-30$ = $-9$ = $-41$ = $-9$ = $-41$ = $-8$ = $7$ = $-33$	s of Escleration $\frac{l_0}{l_0}$ $\frac{l_0}{40}$ $\frac{l_0}{49}$ $\frac{l_0}{15}$ $\frac{l_0}{49}$	henburg- $l_1 = -2, \frac{l_1}{l_1}$ $-8$ $21$ $39$ $2$ $18$ $47$ $33$ $21$ $11$ $1$	Kruggel spaces $s_2 = 1/60$ $\begin{array}{r} s_1 \\ \hline -131/280 \\ -121/280 \\ -111/280 \\ -101/280 \\ -13/40 \\ -81/280 \\ -71/280 \\ -61/280 \\ -51/280 \\ -41/280 \\ -41/280 \end{array}$	sum  0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	with $ r $ $k_0$ $-24$ $-126$ $-26$ $-69$ $-46$ $-47$ $-118$ $-68$ $-97$ $-26$	$\begin{array}{c} \text{nism cla} \\  =5,s \\ k_1 \\ \hline \\ -9 \\ -38 \\ 12 \\ 21 \\ 4 \\ 16 \\ -6 \\ 14 \\ 41 \\ -6 \end{array}$	ss of E = -1, $-1$ $-9$ $-2$ $-5$ $-3$ $-44$ $-10$ $-9$ $-2$ $-2$ $-2$ $-3$	schenburger $p_1 = -\frac{1}{l0}$ $p_2 = -\frac{1}{l0}$ $p_3 = -\frac{1}{l0}$ $p_4 = -\frac{1}{l0}$	$\begin{array}{llllllllllllllllllllllllllllllllllll$
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	sum  -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1	omorphis with $ r  = \frac{k_0}{k_0}$ 41 - 92 - 87 - 19 129 - 99 91 - 47 22 80 - 55	sm class = $5$ , $s = \frac{k_1}{k_1}$ = $\frac{k_1}{k_1}$ = $\frac{k_1}{k_1}$ = $\frac{k_1}{k_2}$ = $\frac{k_1}{k_1}$ = $\frac{k_1}{k_2}$ = $\frac{k_1}{k_2}$ = $\frac{k_1}{k_1}$ = $\frac{k_1}{k_2}$ = $\frac{k_1}{k_1}$ = $\frac{k_1}{k_2}$ = $\frac{k_1}{k_2}$ = $\frac{k_1}{k_1}$ = $\frac{k_1}{k_2}$ = $\frac{k_1}{k_2}$	s of Escleration of Escleration (Escleration) and (Escleration) a	henburg- $l_1 = -2$ , $l_1$ -8 21 39 2 2 18 47 33 21 11 1 9		sum 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	with $ r $ $k_0$ $-24$ $-126$ $-26$ $-69$ $-46$ $-47$ $-118$ $-68$ $-97$ $-26$ $-18$	$\begin{array}{c} \text{aism cla} \\  =5,s \\ k_1 \\ \hline -9 \\ -38 \\ 12 \\ 21 \\ 4 \\ 16 \\ -6 \\ 14 \\ 41 \\ -6 \\ 4 \end{array}$	ss of E = $-1$ ,  -1  -9  -2  -5  -3  -44  -10  -9  -9  -10  -9  -10	schenberger $p_1 = -\frac{0}{l}$ $p_1 = -\frac{0}{l}$ $p_2 = -\frac{1}{l}$ $p_3 = -\frac{1}{l}$ $p_4 = -$	$\begin{array}{llllllllllllllllllllllllllllllllllll$
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	sum  -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1	omorphis with $ r  = \frac{k_0}{k_0}$ 41 - 92 - 87 - 19 129 - 99 91 - 47 22 80 - 55 72	sm class = $5$ , $s = \frac{k_1}{k_1}$ = $\frac{k_1}{k_1}$ = $\frac{k_1}{k_1}$ = $\frac{k_1}{k_2}$ = $\frac{k_1}{k_2}$ = $\frac{k_1}{k_2}$ = $\frac{k_1}{k_2}$ = $\frac{k_1}{k_1}$ = $\frac{k_1}{k_2}$ = $\frac{k_1}{k_2}$	s of Escler 1, product	henburg- $l_1 = -2$ , $l_1$ -8 21 39 2 2 18 47 33 21 11 1 9 29		sum  0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	with $ r $ $k_0$ $-24$ $-126$ $-69$ $-46$ $-47$ $-118$ $-68$ $-97$ $-26$ $-18$ $-47$	$\begin{array}{c} \text{aism class} \\  =5,s\\ \frac{k_1}{-9} \\ -38 \\ 12 \\ 21 \\ 4 \\ 16 \\ -6 \\ 14 \\ 41 \\ -6 \\ 4 \\ 16 \end{array}$	ss of E = -1,	schenberger $p_1 = -\frac{1}{l}$ $p_1 = -\frac{1}{l}$ $p_2 = -\frac{1}{l}$ $p_3 = -\frac{1}{l}$ $p_4 = -\frac{1}{l}$ $p_4 = -\frac{1}{l}$ $p_5 = -\frac{1}{l}$ $p_6 = -$	$\begin{array}{llll} \text{urg-Kruggel spaces} \\ -2,  s_2 = 1/10 \\ t_1 & s_1 \\ \hline t_6 & -131/280 \\ -22 & -121/280 \\ 3 & -111/280 \\ -6 & -101/280 \\ -9 & -13/40 \\ 12 & -81/280 \\ 29 & -71/280 \\ 11 & -61/280 \\ 34 & -51/280 \\ -9 & -41/280 \\ 1 & -31/280 \\ -6 & -3/40 \\ \end{array}$
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	sum  -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1	omorphis with $ r  = \frac{k_0}{k_0}$ 41 - 92 - 87 - 19 129 - 99 47 - 47 22 80 - 55 72 191	sm class = $5$ , $s = \frac{k_1}{k_1}$ = $-11$ = $-28$ = $-30$ = $-9$ = $-41$ = $-8$ = $-7$ = $-33$ = $-8$ = $-41$	s of Escler   = -1, product   10   40   69   49   15   122   -62   90   -29   19   69   55   149   162	henburg- $l_1 = -2$ , $l_2$ $l_3$ $l_4$ $l_5$ $l_6$ $l_8$	Kruggel spaces $s_2 = 1/60$ $\begin{array}{r} s_1 \\ \hline -131/280 \\ -121/280 \\ -111/280 \\ -101/280 \\ -13/40 \\ -81/280 \\ -71/280 \\ -61/280 \\ -51/280 \\ -41/280 \\ -31/280 \\ -31/280 \\ -3/40 \\ -11/280 \\ \end{array}$	sum  0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	with $ r $ $k_0$ $-24$ $-126$ $-26$ $-69$ $-46$ $-47$ $-118$ $-68$ $-97$ $-26$ $-18$ $-47$	$\begin{array}{c} \text{nism cla} \\  =5,s \\ k_1 \\ \hline \\ -9 \\ -38 \\ 12 \\ 21 \\ 4 \\ 166 \\ -66 \\ 14 \\ 41 \\ -6 \\ 4 \\ 166 \\ 8 \\ \end{array}$	ss of E = -1,  -1,  -1,  -2,  -5,  -3,  -4,  -10,  -6,  -9,  -1,  -1,  -1,  -1,  -1,  -1,  -1	schenberger $p_1 = -\frac{1}{l}$ $p_1 = -\frac{1}{l}$ $p_2 = -\frac{1}{l}$ $p_3 = -\frac{1}{l}$ $p_3 = -\frac{1}{l}$ $p_4 = -$	$\begin{array}{llll} \operatorname{urg-Kruggel} & \operatorname{spaces} \\ -2,  s_2 = 1/10 \\ t_1 & s_1 \\ \hline t_6 & -131/280 \\ -2 & -121/280 \\ 3 & -111/280 \\ -6 & -101/280 \\ -9 & -13/40 \\ 22 & -81/280 \\ 29 & -71/280 \\ 11 & -61/280 \\ 44 & -51/280 \\ 1 & -31/280 \\ -6 & -3/40 \\ 4 & -11/280 \\ \end{array}$
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	sum  -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1	omorphis with $ r  = \frac{k_0}{k_0}$ 41 - 92 - 19 - 129 - 99 - 47 - 22 - 80 - 55 - 72 - 191 - 50 -	sm class = $5$ , $s = \frac{k_1}{k_1}$ = $-11$ = $-28$ = $-30$ = $-9$ = $-41$ = $-8$ = $7$ = $-33$ = $2$ = $-8$ = $-41$ = $-18$	s of Escler   = -1, pr lo 40 49 15 122	henburg- $1 = -2$ , $\frac{1}{2}$ -8 $\frac{1}{2}$ -8 $\frac{1}{2}$ $\frac{1}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ 	$\begin{array}{c} \text{Kruggel spaces} \\ s_2 = 1/60 \\ \hline \\ s_1 \\ \hline \\ -131/280 \\ -121/280 \\ -111/280 \\ -101/280 \\ -13/40 \\ -81/280 \\ -71/280 \\ -61/280 \\ -51/280 \\ -41/280 \\ -31/280 \\ -3/40 \\ -11/280 \\ -1/280 \\ -1/280 \\ \end{array}$	sum  0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	with $ r $ $k_0$ $-24$ $-126$ $-26$ $-69$ $-46$ $-47$ $-118$ $-68$ $-97$ $-26$ $-18$ $-47$ $-19$	$\begin{array}{c} \text{nism cla} \\  =5,s \\ k_1 \\ \hline \\ -9 \\ -38 \\ 12 \\ 21 \\ 4 \\ 16 \\ -6 \\ 44 \\ -6 \\ 44 \\ 16 \\ 8 \\ 21 \\ \end{array}$	ss of E = -1,  -1,  -2,  -3,  -3,  -10,  -6,  -9,  -1,  -6,  -1,  -6,  -6,  -6,  -7,  -7,  -7,  -7,  -7	schenberger schen	$\begin{array}{llllllllllllllllllllllllllllllllllll$
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	sum  -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1	omorphis with $ r  = \frac{k_0}{k_0}$ 41 - 92 - 87 - 19 129 - 99 91 - 47 22 80 - 55 72 191 - 50 - 52	sm class = $5$ , $s = \frac{k_1}{k_1}$ = $\frac{11}{-28}$ = $\frac{-30}{-9}$ = $\frac{-41}{-9}$ = $\frac{-41}{-8}$ = $\frac{-33}{2}$ = $\frac{2}{-8}$ = $\frac{-41}{-18}$ = $\frac{15}{15}$	s of Escle = -1, p: l <sub>0</sub> 40 40 69 449 15 122 - 62 90 - 29 19 69 51 49 162 31 41	henburg- $l_1 = -2$ , $l_2$ $l_3$ $l_4$		sum  0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	with $ r $ $k_0$ $-24$ $-126$ $-26$ $-69$ $-46$ $-47$ $-118$ $-68$ $-97$ $-26$ $-18$ $-47$ $-19$ $-72$ $-144$	$\begin{array}{c} \text{nism cla} \\  =5,s \\ \hline \\ -9 \\ -38 \\ 12 \\ 21 \\ 14 \\ 16 \\ -6 \\ 14 \\ 41 \\ -6 \\ 4 \\ 16 \\ 8 \\ 21 \\ 51 \\ \end{array}$	ss of E = -1,  -1  -9  -2  -5  -3  -4  -10  -6  -9  -2  -1  -3  -1  -6  -13	schenberger schenberger schenberger schenberger schenberger specification $p_1 = -\frac{1}{0}$ schenberger schenberger specification $p_1 = -\frac{1}{0}$ schenberger schenberger schenberger specification $p_1 = -\frac{1}{0}$ schenberger schenberger specification $p_1 = -\frac{1}{0}$ schenberger specification $p_2 = -\frac{1}{0}$ schenberger specification $p_1 = -\frac{1}{0}$ schenberger specification $p_2 = -\frac{1}{0}$ schenberger sp	$\begin{array}{llllllllllllllllllllllllllllllllllll$
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	sum  -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1	omorphis with $ r  = \frac{k_0}{k_0}$ 41	sm class = $5$ , $s = \frac{k_1}{k_1}$ = $\frac{k_1}{k_1}$ = $\frac{k_1}{k_1}$ = $\frac{k_1}{k_1}$ = $\frac{k_1}{k_1}$ = $\frac{k_1}{k_2}$ = $\frac{k_1}{k_1}$ = $\frac{k_1}{k_2}$ = $\frac{k_1}{k_1}$ = $\frac{k_1}{k_1}$ = $\frac{k_1}{k_2}$ = $\frac{k_1}{k_1}$ = $\frac{k_1}{k_1}$ = $\frac{k_1}{k_2}$ = $\frac{k_1}{k_1}$ = $\frac{k_1}{k$	s of Escle $=-1$ , $p_1$ $=$ $=$ $=$ $=$ $=$ $=$ $=$ $=$ $=$ $=$	henburg- $1 = -2$ , $\frac{1}{2}$ -8 $\frac{1}{2}$ -8 $\frac{2}{2}$ $\frac{3}{2}$ $\frac{2}{2}$ $\frac{1}{1}$ $\frac{1}{1}$ $\frac{1}{9}$ $\frac{2}{2}$ $\frac{2}{2}$ $\frac{1}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ 	$\begin{array}{c} \text{Kruggel spaces} \\ s_2 = 1/60 \\ \hline \\ & s_1 \\ \hline \\ -131/280 \\ -121/280 \\ -111/280 \\ -101/280 \\ -13/40 \\ -81/280 \\ -71/280 \\ -61/280 \\ -51/280 \\ -41/280 \\ -31/280 \\ -31/280 \\ -11/280 \\ -11/280 \\ 9/280 \\ 19/280 \\ 29/280 \\ 29/280 \\ \end{array}$	sum  0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	with $ r $ $k_0$ $-24$ $-126$ $-26$ $-26$ $-46$ $-47$ $-118$ $-68$ $-97$ $-26$ $-18$ $-47$ $-19$ $-72$ $-144$ $-89$	$\begin{array}{c} \text{nism cla} \\  =5,s \\ \frac{k_1}{2} \\ -9 \\ -38 \\ 122 \\ 21 \\ 4 \\ 16 \\ -66 \\ 14 \\ 41 \\ -66 \\ 8 \\ 21 \\ 51 \\ 16 \end{array}$		schenberger schen	$\begin{array}{llllllllllllllllllllllllllllllllllll$
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	sum  -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1	omorphis with $ r  = \frac{k_0}{k_0}$ 41 - 92 - 87 - 19 129 - 99 91 - 47 22 80 55 72 191 - 50 - 52 29 110 69	sm class = $5$ , $s = \frac{k_1}{2}$ = $\frac{k_1}{2}$ = $\frac{k_1}{2$	$\begin{array}{l} \text{s of Escl} \\ = -1, \ p; \\ l_0 \\ \hline \\ 40 \\ 69 \\ 49 \\ 15 \\ 15 \\ 15 \\ 122 \\ -62 \\ 90 \\ -29 \\ 19 \\ 69 \\ 51 \\ 49 \\ 162 \\ 31 \\ 41 \\ 22 \\ 88 \\ 47 \\ \end{array}$	henburg- $_1 = -2$ , $_2 = -2$ , $_3 = -2$ , $_4 = -2$ , $_4 = -2$ , $_5 = -2$ , $_$	Kruggel spaces $s_2 = 1/60$ $\begin{array}{r} s_1 \\ -131/280 \\ -121/280 \\ -111/280 \\ -101/280 \\ -31/40 \\ -81/280 \\ -71/280 \\ -61/280 \\ -51/280 \\ -41/280 \\ -31/280 \\ -31/280 \\ -1/280 \\ 9/280 \\ 19/280 \\ 29/280 \\ 39/280 \\ 39/280 \\ \end{array}$	sum  0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	with $ r $ $k_0$ $-24$ $-126$ $-26$ $-69$ $-46$ $-47$ $-118$ $-68$ $-97$ $-26$ $-18$ $-47$ $-19$ $-72$ $-144$ $-89$ $-79$ $-76$	$\begin{array}{c} \text{nism cla} \\  =5,s \\ \hline \\ -9 \\ -38 \\ 122 \\ 21 \\ 4 \\ 166 \\ -66 \\ 144 \\ 41 \\ -66 \\ 4 \\ 16 \\ 8 \\ 21 \\ 16 \\ 23 \\ 22 \\ 23 \\ 22 \end{array}$		schenberger schen	$\begin{array}{llllllllllllllllllllllllllllllllllll$
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	sum  -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1	omorphis with $ r  = \frac{k_0}{k_0}$ 41 - 92 - 87 - 19 129 - 99 91 - 47 22 80 - 55 72 191 - 50 - 52 29 110 69 - 49	$\begin{array}{l} \text{sm class} \\ = 5, \ s = \\ k_1 \\ \hline -11 \\ -28 \\ -30 \\ -9 \\ -41 \\ -9 \\ -41 \\ -8 \\ 7 \\ -33 \\ 2 \\ -8 \\ -41 \\ -18 \\ 15 \\ -1 \\ 7 \\ -31 \\ 9 \end{array}$	$\begin{array}{c} \text{s of Escl} \\ = -1, \ p: \\ l_0 \\ \end{array}$	henburg- 1 = -2, $1 = -2$ , $1 =$		0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	$\begin{array}{c} \text{with }   r \\ k_0 \\ \hline -24 \\ -126 \\ -69 \\ -46 \\ -47 \\ -118 \\ -68 \\ -97 \\ -26 \\ -18 \\ -47 \\ -19 \\ -72 \\ -144 \\ -89 \\ -79 \\ -76 \\ -67 \\ -72 \end{array}$	$\begin{array}{c} \text{nism cla} \\  =5,s \\ k_1 \\ \hline \\ -9 \\ -38 \\ 12 \\ 21 \\ 4 \\ 16 \\ -6 \\ 144 \\ 41 \\ -6 \\ 4 \\ 166 \\ 8 \\ 21 \\ 51 \\ 16 \\ 23 \\ 22 \\ -39 \\ \end{array}$	$\begin{array}{c} \text{ss of E} \\ = -1, \\ -1 \\ -9 \\ -2 \\ -5 \\ -3 \\ -4 \\ -10 \\ -6 \\ -9 \\ -2 \\ -1 \\ -3 \\ -1 \\ -3 \\ -1 \\ -6 \\ -6 \\ -6 \\ -6 \\ -6 \\ -6 \\ -6$	schenberger schen	$\begin{array}{llllllllllllllllllllllllllllllllllll$
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	sum  -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1	omorphis with $ r  = \frac{k_0}{k_0}$ 41	$\begin{array}{l} \text{sm class} \\ = 5,  s = \\ k_1 \\ \hline -11 \\ -28 \\ -30 \\ -9 \\ -41 \\ -8 \\ 7 \\ -33 \\ 2 \\ -8 \\ -41 \\ -18 \\ 15 \\ -1 \\ 7 \\ -31 \\ 9 \\ 7 \end{array}$	$\begin{array}{l} \text{s of Escl} \\ = -1, \ p; \\ l_0 \\ \end{array} \\ \begin{array}{l} l_0 \\ \end{array} \\ \begin{array}{l} 40 \\ 69 \\ 49 \\ 15 \\ 122 \\ -62 \\ 90 \\ -29 \\ 19 \\ 69 \\ 51 \\ 49 \\ 162 \\ 31 \\ 41 \\ 22 \\ 89 \\ 47 \\ 47 \\ 59 \\ \end{array}$	henburg- $_1 = -2$ , $_2 = -2$ , $_3 = -2$ , $_4 = -2$ , $_4 = -2$ , $_5 = -2$ , $_$	$\begin{array}{c} \text{Kruggel spaces} \\ s_2 = 1/60 \\ \hline \\ & s_1 \\ \hline \\ -131/280 \\ -121/280 \\ -111/280 \\ -101/280 \\ -13/40 \\ -81/280 \\ -71/280 \\ -61/280 \\ -51/280 \\ -41/280 \\ -31/280 \\ -31/280 \\ -11/280 \\ -11/280 \\ 9/280 \\ 19/280 \\ 19/280 \\ 39/280 \\ 7/40 \\ 59/280 \\ \end{array}$	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	with $ r $ $k_0$ $-24$ $-126$ $-26$ $-26$ $-46$ $-47$ $-118$ $-68$ $-97$ $-26$ $-18$ $-47$ $-19$ $-72$ $-148$ $-79$ $-76$ $-86$	$\begin{array}{l} \text{nism cla} \\  =5,s\\ \frac{k_1}{4} \\ -9\\ -38\\ 122\\ 211\\ 4\\ 16\\ -66\\ -14\\ 411\\ -66\\ 8\\ 21\\ 16\\ 23\\ 22\\ -39\\ 32\\ 33\\ 33\\ 33\\ \end{array}$	$\begin{array}{c} -1 \\ -1 \\ -2 \\ -5 \\ -3 \\ -4 \\ -10 \\ -6 \\ -9 \\ -2 \\ -11 \\ -6 \\ -13 \\ -6 \\ -6 \\ -6 \\ -7 \end{array}$	schenberger schen	$\begin{array}{llllllllllllllllllllllllllllllllllll$
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	sum  -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1	omorphis with $ r  = \frac{k_0}{k_0}$ 41 - 92 - 87 - 19	sm class = $5$ , $s$ = $\frac{1}{k_1}$ = $\frac{1}{k_1}$ = $\frac{1}{28}$ = $\frac{1}{28}$ = $\frac{1}{30}$ = $\frac{1}{9}$ = $\frac{1}{30}$ = $\frac{1}{30}$	$\begin{array}{l} \text{s of Escl} \\ = -1, \ p; \\ l_0 \\ \hline \\ 40 \\ 69 \\ 49 \\ 49 \\ 15 \\ 122 \\ -62 \\ 90 \\ -29 \\ 19 \\ 69 \\ 69 \\ 69 \\ 51 \\ 49 \\ 162 \\ 31 \\ 41 \\ 22 \\ 47 \\ 47 \\ 47 \\ 47 \\ 49 \\ 49 \\ 49 \\ 49$	henburg- $_1 = -2$ , $_2 = -2$ , $_3 = -2$ , $_4 = -2$ , $_4 = -2$ , $_5 = -2$ , $_$		sum  0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	$\begin{array}{c} \text{with }   r \\ k_0 \\ \hline \\ -24 \\ -126 \\ -26 \\ -26 \\ -69 \\ -46 \\ -68 \\ -97 \\ -118 \\ -68 \\ -97 \\ -26 \\ -18 \\ -47 \\ -19 \\ -72 \\ -144 \\ -89 \\ -76 \\ -72 \\ -76 \\ -72 \\ -76 \\ -66 \\ -66 \\ -66 \\ -66 \end{array}$	ism cla  =5, s $k_1$ -98 -38 12 21 4 16 -6 14 41 -6 8 21 15 16 22 -39 32 -39 32 -39 32 -39 32 -39 32 32 32 32 32 32 33	$\begin{array}{c} \text{ss of E} \\ = -1, \\ -1 \\ -2 \\ -5 \\ -3 \\ -4 \\ -10 \\ -6 \\ -3 \\ -2 \\ -11 \\ -6 \\ -13 \\ -5 \\ -6 \\ -6 \\ -6 \\ -7 \\ -5 \end{array}$	schenberger schen	$\begin{array}{llllllllllllllllllllllllllllllllllll$
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	sum  -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1	omorphis with $ r  = \frac{k_0}{k_0}$ 41 - 92 - 87 - 19 129 - 99 91 - 47 22 80 - 55 572 191 - 50 2 29 110 69 - 69 - 69 - 62 - 62 - 62 - 62 - 62 -	sm class = $5$ , $s = \frac{k_1}{k_1}$ = $-11$ = $-28$ = $-30$ = $-9$ = $-41$ = $-8$ = $7$ = $-33$ = $-8$ = $-41$ = $-18$ = $-15$ = $-17$ = $-18$ = $-17$ = $-18$ = $-18$	$\begin{array}{c} \text{s of Escl} \\ = -1, \ p; \\ l_0 \\ \end{array}$	henburg- 1 = -2, $1 = -2$ , $1 =$		0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	$\begin{array}{c} \text{with }   r \\ k_0 \\ \hline \\ -24 \\ -126 \\ -26 \\ -69 \\ -46 \\ -47 \\ -118 \\ -68 \\ -69 \\ -26 \\ -118 \\ -47 \\ -19 \\ -72 \\ -144 \\ -89 \\ -79 \\ -76 \\ -72 \\ -86 \\ -66 \\ -66 \\ -66 \end{array}$	$\begin{array}{c} \text{nism cla} \\  =5,s \\ k_1 \\ \hline \\ -9 \\ -38 \\ 12 \\ 21 \\ 4 \\ 16 \\ -6 \\ 14 \\ 41 \\ -6 \\ 41 \\ 16 \\ 8 \\ 21 \\ 51 \\ 16 \\ 23 \\ 22 \\ -39 \\ 32 \\ -28 \\ 23 \\ -28 \\ 22 \\ -28 \\ 23 \end{array}$	$\begin{array}{c} -1 \\ -1 \\ -2 \\ -2 \\ -5 \\ -4 \\ -10 \\ -6 \\ -6 \\ -11 \\ -6 \\ -13 \\ -6 \\ -6 \\ -6 \\ -7 \\ -5 \\ -5 \\ -5 \\ -5 \\ -5 \\ -5 \\ -5$	schenberger schen	$\begin{array}{llllllllllllllllllllllllllllllllllll$
-1 91 $-21$ 87 $-10$ 129/280 0 $-156$ 74 $-139$ 8 129/280	sum  -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1	omorphis with $ r  = \frac{k_0}{k_0}$ 41 - 92 - 87 - 19   129 - 99   91   47   22   80   55   72   191   50   52   29   110   69   49   90   55   62   62   62   62   60   60   60   60	sm class = $5$ , $s$ = $\frac{1}{2}$ = $\frac{1}{2$	$\begin{array}{l} \text{s of Escl} \\ = -1, \ p: \\ l_0 \\ \end{array} \\ \begin{array}{l} l_0 \\ \end{array} \\ \begin{array}{l} 40 \\ 69 \\ 49 \\ 15 \\ 122 \\ -62 \\ \end{array} \\ \begin{array}{l} 90 \\ -29 \\ 19 \\ 69 \\ 551 \\ 49 \\ 162 \\ 31 \\ 41 \\ 22 \\ \end{array} \\ \begin{array}{l} 40 \\ 61 \\ -72 \\ \end{array}$	henburg- $_1 = -2$ , $_2 = -2$ , $_3 = -2$ , $_4 = -2$ , $_4 = -2$ , $_4 = -2$ , $_5 = -2$ , $_$	$\begin{array}{l} \text{Kruggel spaces} \\ s_2 = 1/60 \\ \hline \\ & s_1 \\ \hline \\ -131/280 \\ -121/280 \\ -111/280 \\ -101/280 \\ -13/40 \\ -81/280 \\ -61/280 \\ -61/280 \\ -51/280 \\ -41/280 \\ -31/280 \\ -31/280 \\ -11/280 \\ -11/280 \\ -1/280 \\ 9/280 \\ 19/280 \\ 19/280 \\ 39/280 \\ 7/40 \\ 59/280 \\ 69/280 \\ 79/280 \\ 89/280 \\ 89/280 \\ 89/280 \\ \end{array}$	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	$\begin{array}{c} \text{with }   r \\ k_0 \\ \hline \\ -24 \\ -126 \\ -69 \\ -46 \\ -69 \\ -47 \\ -118 \\ -68 \\ -97 \\ -26 \\ -18 \\ -47 \\ -19 \\ -72 \\ -14 \\ -89 \\ -79 \\ -76 \\ -76 \\ -66 \\ -66 \\ -66 \\ -66 \\ -66 \\ -66 \\ -32 \\ \end{array}$	$\begin{array}{l} \text{nism cla} \\  =5,s\\ \frac{k_1}{k_1} \\ -9\\ -38\\ 12\\ 21\\ 4\\ 16\\ -66\\ 14\\ 41\\ -66\\ 21\\ 16\\ 23\\ 22\\ -39\\ 32\\ -28\\ 23\\ 1 \end{array}$	$\begin{array}{c} \text{ss of E} \\ = -1, \\ -1, \\ -2, \\ -2, \\ -3, \\ -4, \\ -10, \\ -6, \\ -9, \\ -11, \\ -6, \\ -13, \\ -5, \\ -6, \\ -7, \\ -5, \\ -2, \\ -2, \\ -2, \\ -2, \\ -3, \\ -1, \\ -6, \\ -6, \\ -7, \\ -5, \\ -2, \\$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{llllllllllllllllllllllllllllllllllll$
	sum  -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1	omorphis with $ r  = \frac{k_0}{k_0}$ 41 - 92 - 87 - 19 129 - 99 91 - 47 22 80 - 55 572 191 - 50 52 29 110 69 - 62 - 109 - 70 - 110	sm class = $5$ , $s$ = $\frac{1}{k_1}$ = $\frac{1}{k_1}$ = $\frac{1}{28}$ = $\frac{1}{30}$ = $\frac{1}{28}$ = $\frac{1}{30}$ = $\frac{1}{28}$ = $\frac{1}{41}$ = $\frac{1}{8}$ = $\frac{1}{41}$ = $\frac{1}{15}$ = $\frac{1}{1$	$\begin{array}{l} \text{s of Escl} \\ = -1, \ p; \\ l_0 \\ \end{array}$ $\begin{array}{l} 40 \\ 69 \\ 49 \\ 15 \\ 1522 \\ -62 \\ 90 \\ -62 \\ 99 \\ -62 \\ 99 \\ -62 \\ 19 \\ 69 \\ 19 \\ 69 \\ 149 \\ 162 \\ 31 \\ 44 \\ 22 \\ 89 \\ 47 \\ 47 \\ 47 \\ 47 \\ 47 \\ 47 \\ 49 \\ 61 \\ -72 \\ 61 \\ 99 \\ 99 \\ \end{array}$	henburg-1 = $-2$ , $\cdot l_1$ $-8$ $\cdot l_1$ $-8$ $\cdot l_2$ $\cdot l_3$ $\cdot l_4$ $\cdot l_4$ $\cdot l_5$ $\cdot l_6$ $\cdot l_7$ $\cdot l_8$ $\cdot l_8$ $\cdot l_7$ $\cdot l_8$	Kruggel spaces $s_2 = 1/60$	sum  0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	$\begin{array}{c} \text{with }   r \\ k_0 \\ \hline \\ -24 \\ -126 \\ -26 \\ -69 \\ -47 \\ -118 \\ -68 \\ -69 \\ -26 \\ -18 \\ -47 \\ -19 \\ -72 \\ -144 \\ -89 \\ -79 \\ -79 \\ -76 \\ -66 \\ -64 \\ -32 \\ -98 \\ -99 \\ -$	$\begin{array}{c} \text{nism cla} \\  =5,s \\ \hline \\ k_1 \\ \hline \\ -9 \\ -38 \\ 12 \\ 21 \\ 4 \\ 16 \\ -6 \\ -14 \\ 41 \\ -6 \\ 8 \\ 21 \\ 151 \\ 16 \\ 23 \\ 22 \\ -39 \\ 32 \\ 22 \\ -28 \\ 23 \\ 124 \\ \end{array}$	= -1, -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1	schenberger schen	$\begin{array}{llllllllllllllllllllllllllllllllllll$
-1 91 $-21$ 90 $-18$ $139/280$ 0 $-56$ 2 $-39$ $-24$ $139/280$	sum  -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1	omorphis with $ r  = \frac{k_0}{k_0}$ 41 - 92 - 87 - 19 129 - 99 91 - 47 22 - 80 - 55 72 - 191 - 50 - 52 191 - 69 - 90 55 - 62 - 70 110 - 9	sm class = $5$ , $s$ = $\frac{1}{2}$ sm class = $\frac{1}{2$	$\begin{array}{c} s \text{ of Escl} = -1, \ p: \\ l_0 \\ l_0 \\ d0 \\ d9 \\ d9 \\ d9 \\ d9 \\ d9 \\ d9 \\ -29 \\ 19 \\ 69 \\ 51 \\ 49 \\ 162 \\ 31 \\ 41 \\ 22 \\ 89 \\ 47 \\ 59 \\ 49 \\ 61 \\ -72 \\ 61 \\ 99 \\ 7 \end{array}$	henburg- $_1 = -2$ , $_2 = -2$ , $_3 = -2$ , $_4 = -2$ , $_4 = -2$ , $_4 = -2$ , $_5 = -2$ , $_$	$\begin{array}{l} \text{Kruggel spaces} \\ s_2 = 1/60 \\ \hline \\ s_1 \\ \hline \\ -131/280 \\ -121/280 \\ -111/280 \\ -101/280 \\ -13/40 \\ -81/280 \\ -71/280 \\ -61/280 \\ -51/280 \\ -41/280 \\ -31/280 \\ -41/280 \\ -11/280 \\ -1/280 \\ 9/280 \\ 19/280 \\ 19/280 \\ 19/280 \\ 39/280 \\ 7/40 \\ 59/280 \\ 69/280 \\ 79/280 \\ 89/280 \\ 99/280 \\ 199/280 \\ 199/280 \\ 199/280 \\ 199/280 \\ 199/280 \\ 199/280 \\ 199/280 \\ 109/280 \\ 109/280 \\ 109/280 \\ 17/40 \\ \end{array}$	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	$\begin{array}{c} \text{with }   r \\ k_0 \\ \hline \\ -24 \\ -126 \\ -26 \\ -69 \\ -46 \\ -47 \\ -118 \\ -68 \\ -97 \\ -26 \\ -18 \\ -97 \\ -72 \\ -144 \\ -89 \\ -79 \\ -76 \\ -66 \\ -64 \\ -64 \\ -32 \\ -98 \\ -98 \\ -99 \\ -126 $	$\begin{array}{l} \text{nism cla} \\  =5,s\\ \frac{k_1}{8} \\ -9\\ -38\\ 12\\ 21\\ 4\\ 16\\ -66\\ 14\\ 41\\ -66\\ 8\\ 8\\ 21\\ 51\\ 16\\ 22\\ -39\\ 32\\ -28\\ 23\\ -28\\ 23\\ 1\\ 1\\ 4\\ 13\\ 14\\ \end{array}$	= -1, -1, -2, -2, -2, -2, -2, -2, -2, -2, -2, -2	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{llllllllllllllllllllllllllllllllllll$
	sum  -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1	omorphis with $ r  = \frac{k_0}{k_0}$ 41 - 92 - 87 - 19   129 - 99   47 - 22   80   55   72   191   50   69   - 49   90   55   62   29   110   69   - 40   90   55   62   109   - 70   - 70   110   9   91   - 9   91   - 9   91   - 9   91   - 9   91   - 9   91   - 9   10   10   10   10   10   10   10	sm class = $5$ , $s$ = $\frac{1}{k_1}$ = $\frac{1}{k_1}$ = $\frac{1}{2}$ = $\frac{1}{2}$	$\begin{array}{c} \text{s of Escl} \\ = -1, \ p; \\ l_0 \\ \end{array}$ $\begin{array}{c} l_0 \\ 40 \\ 69 \\ 49 \\ 49 \\ 15 \\ 122 \\ -62 \\ 29 \\ 19 \\ 69 \\ 51 \\ 49 \\ 69 \\ 49 \\ 162 \\ 31 \\ 41 \\ 222 \\ 89 \\ 47 \\ 47 \\ 47 \\ 47 \\ 47 \\ 47 \\ 49 \\ 61 \\ -72 \\ 61 \\ 99 \\ 7 \\ 87 \\ -8$	henburg- $_1 = -2$ , $_2 = -2$ , $_3 = -2$ , $_4 = -2$ , $_$	Kruggel spaces $s_2 = 1/60$	sum  0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	$\begin{array}{c} \text{with }   r \\ k_0 \\ \hline -24 \\ -126 \\ -69 \\ -46 \\ -69 \\ -47 \\ -118 \\ -68 \\ -97 \\ -26 \\ -18 \\ -47 \\ -19 \\ -79 \\ -79 \\ -79 \\ -76 \\ -72 \\ -86 \\ -64 \\ -32 \\ -98 \\ -29 \\ -126 \\ -156 \\ $	$\begin{array}{l} \text{nism cla} \\  =5,s \\ \hline \\ \frac{k_1}{2} \\ -38 \\ 12 \\ 21 \\ 4 \\ 16 \\ -6 \\ 16 \\ 8 \\ 21 \\ 16 \\ 23 \\ 22 \\ -28 \\ 23 \\ 22 \\ -28 \\ 23 \\ 13 \\ 14 \\ 14 \\ 14 \\ 14 \\ 16 \\ 16 \\ 16 \\ 16$	= -1, -1	schenberger schen	$\begin{array}{llllllllllllllllllllllllllllllllllll$

Table 7, continued from previous page

$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$s_1$
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	-1 89 6 77 25 $-121/2$	
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	1  -14  6  -7  -7  -111/280		280
$\begin{array}{cccccccccccccccccccccccccccccccccccc$		-1 124 $-31$ 97 25 $-111/2$	
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$		-1 117 $-43$ 81 34 $-101/2$	
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$		-1 121 $-26$ 117 $-15$ $-13/$	40
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$			
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$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	1 $-35$ 13 $-34$ 9 $-51/280$	-1 165 $-83$ 134 16 $-51/2$	280
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homeomorphism class of Eschenburg-Kruggel spaces with $ r  = 5$ , $s = -1$ , $p_1 = -2$ , $s_2 = 7/20$ with $ r  = 5$ , $s = -1$ , $p_1 = -2$ , $s_2 = 7/20$ with $ r  = 5$ , $s = -1$ , $p_1 = -2$ , $s_2 = 13/30$ sum $k_0$ $k_1$ $l_0$ $l_1$ $s_1$ $s_1$ $s_1$ $k_0$ $k_1$ $l_0$ $l_1$ $s_1$ $s_1$ $s_1$ $s_1$ $k_0$ $k_1$ $l_0$ $l_1$ $l_1$ $l_0$ $l_1$ $l_1$ $l_0$ $l_1$ $l_1$ $l_0$ $l_1$ $l_1$ $l_0$ $l_1$ $l$			
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$\begin{array}{cccccccccccccccccccccccccccccccccccc$	0  -52  26  -51  17  -3/40	$1  -79  29  -77  20 \qquad -3/$	40
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$0  -94  26  -51  -46 \qquad 59/280 \qquad 1  -39  19  -37  8 \qquad 59/280 \qquad 1  -39  19  -37  8  59/280  1  -39  19  -37  8  -39  19  -37  8  59/280  1  -39  19  -37  8  59/280  1  -39  19  -37  8  59/280  1  -39  19  -37  8  59/280  1  -39  19  -37  8  59/280  1  -39  19  -37  8  59/280  1  -39  19  -37  8  59/280  1  -39  19  -37  8  59/280  1  -39  19  -37  10  -39  10  -39  10  -39  -39  10  -39 $			40 /40
0 194 99 111 9 60/990 1 149 69 90 51 60/	0 -94 26 -51 -46 59/280	1 -39 19 -37 8 59/2	280
	0 -124 38 -111 2 69/280	1 -142 68 -89 -51 69/2	
$0  -63  -11  -54  -24 \qquad \qquad 99/280 \qquad \qquad 1  -42 \qquad 8  -39 \qquad 1 \qquad \qquad 99/280 \qquad \qquad 0 \qquad \qquad 0$	$0  -63  -11  -54  -24 \qquad \qquad 99/280$	1  -42  8  -39  1  99/2	280
	0 -104 28 -86 -13 139/280	1 -92 43 -79 -1 139/2	

Table 7, continued from previous page

		α .			Table 7, continued f								
homo	om ornh			tures on		homo	om ove h			ctures or			
nomed	eomorphism class of Eschenburg-Kruggel spaces with $ r =5,\ s=1,\ p_1=-2,\ s_2=1/15$						homeomorphism class of Eschenburg-Kruggel spaces with $ r  = 5$ , $s = 1$ , $p_1 = -2$ , $s_2 = 3/20$						
sum	$k_0$	$k_1$	$l_0$	$l_1$	$s_1$	sum	$k_0$	$k_1$	- 1, p		$s_1$		
-1	52	-15	41	9	-139/280	0	-127	21	-88	8 -46	-139/280		
-1	81	-31	57	22	-129/280	Õ	-68	34	-4'		-129/280		
-1	82	-20	69	9	-17/40	0	-119	53	-118	8 44	-17/40		
-1	90	-28	61	29	-109/280	0	-139	66	-120	6 12			
-1	60	2	41	29	-99/280	0	-76	2	-6'				
-1	152	-18	149	-11	-89/280	0	-56	22	-5				
-1	57	-18	29	29	-79/280	0	-56	4	-49				
$-1 \\ -1$	109 40	-18	100 29	17 9	-69/280 $-59/280$	0	$-188 \\ -38$	64 4	-17' -2'				
$-1 \\ -1$	72	25	69	29	-39/280 $-7/40$	0	-38 $-22$	1	-18				
-1	132	10	89	69	-39/280	0	-199	66	-148		., .		
-1	100	-38	69	29	-29/280	0	-48	-6	-39				
-1	105	-8	89	21	-19/280	0	-29	3	-10				
-1	141	-71	137	-40	-9/280	0	-118	14	-99				
-1	130	-63	129	-51	1/280	0	-102	31	-90				
-1	65	-28	61	-11	11/280	0	-87	26	-80		/		
$-1 \\ -1$	42 49	$-15 \\ 1$	$\frac{41}{32}$	$-11 \\ 25$	$\frac{3/40}{31/280}$	0	-137 $-119$	26 18	-128 $-108$				
-1 -1	65	2	61	9	41/280	0	-22	-9	-10				
-1	21	-11	17	2	51/280	0	-59	26	-48				
-1	137	32	109	69	61/280	0	-106	2	-6'				
-1	89	-31	57	32	71/280	0	-196	92	-13-	4 - 57	71/280		
-1	230	-103	121	109	81/280	0	-159	-19	-118				
-1	70	-23	69	-19	13/40	0	-116	4	-7'				
-1	29	-11	17	12	101/280	0	-47	21	-40				
-1	61	-31	57	-10	111/280	0	-182	21	-130				
$-1 \\ -1$	$\frac{141}{57}$	$-51 \\ 32$	97 49	$\frac{42}{41}$	$\frac{121/280}{131/280}$	0	$-102 \\ -66$	11 24	-50 -50		121/280 $131/280$		
	91	32	43	41	131/200		-00	24	-0.	4 -1	131/200		
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homo													
	omorph		th struc			homo	om ornh		th stru				
		ism clas	s of Es	chenburg	-Kruggel spaces			ism clas	ss of Es	schenbur	g-Kruggel spaces		
sum		ism clas	s of Es	chenburg $_1 = -2$ ,				ism clas	ss of Es	schenbur			
sum	with $r$	ism class $ =5, s$ $k_1$	ss of Es $s = 1, p$ $l_0$	chenburg $l_1 = -2, l_1$	$s_2 = 7/30$	sum	with $ r $ $k_0$	ism clas $  = 5, s$ $k_1$	ss of Es $= 1, p$ $l_0$	schenbur $l_1 = -2, l_1$	$s_2$ -Kruggel spaces $s_2 = 19/60$		
sum	with $r$ $k_0$ $-69$	ism clas $ =5, s$ $k_1$ $16$	ss of Es s = 1, p $l_0$ -37	chenburg $ \begin{array}{c} l_1 = -2, \\ l_1 \end{array} $ $ \begin{array}{c} l_1 \end{array} $	s-Kruggel spaces $s_2 = 7/30$ $\frac{s_1}{-139/280}$	sum	$\frac{\text{with }  r }{k_0}$ 97	ism clas $  = 5, s$ $k_1$ $-45$	ss of Es $= 1, p$ $l_0$ $96$	schenbur $l_1 = -2,$ $l_1$ $l_1$ $l_2$	g-Kruggel spaces $s_2 = 19/60$ $s_1$ $-139/280$		
sum 1 1	with $r$	ism class $ =5, s$ $k_1$ $\frac{16}{11}$	ss of Es s = 1, p $l_0$ -37 -27	chenburg $1 = -2,  l_1$ $7  -35$ $7  -5$	F-Kruggel spaces $s_2 = 7/30$ $s_1$ $-139/280$ $-129/280$	sum	$\frac{\text{with }  r }{k_0}$ $\frac{97}{27}$	ism clas $  = 5, s$ $k_1$ $-45$ $7$	ss of Es $= 1, p$ $l_0$ $96$ $24$	schenbur $l_1 = -2, l_1$	$\begin{array}{c} \text{g-Kruggel spaces} \\ s_2 = 19/60 \\ \hline \\ s_1 \\ \hline \\ -139/280 \\ -129/280 \end{array}$		
sum	with $r$ $k_0$ $-69$ $-34$	ism clas $ =5, s$ $k_1$ $16$	ss of Es s = 1, p $l_0$ -37	chenburg $l_1 = -2, l_1$ $l_2$ $l_3$ $l_4$ $l_5$ $l_6$ $l_7$ $l_8$ $l_8$ $l_8$ $l_8$ $l_8$ $l_8$ $l_8$ $l_8$ $l_8$	s-Kruggel spaces $s_2 = 7/30$ $\frac{s_1}{-139/280}$		$\frac{\text{with }  r }{k_0}$ 97	ism clas $  = 5, s$ $k_1$ $-45$	ss of Es $= 1, p$ $l_0$ $96$	schenbur $l_1 = -2,$ $l_1$ $l_1$ $l_1$ $l_1$ $l_1$ $l_1$ $l_1$	g-Kruggel spaces $s_2 = 19/60$ $s_1$ $-139/280$		
sum	with $r$ $k_0$ $-69$ $-34$ $-47$ $-55$ $-57$	ism class $ =5, s$ $k_1$ $16$ $11$ $15$	ss of Es s = 1, p $l_0$ -37 -27 -46	chenburg $1 = -2, 1$ $l_1$ $7 = -35$ $7 = -5$ $6 = 11$ $9 = -26$	F-Kruggel spaces $s_2 = 7/30$ $s_1$ $-139/280$ $-129/280$ $-17/40$	sum -1 -1 -1 -1 -1 -1	with $ r $ $k_0$ 97 27 75	ism clas $  = 5, s$ $k_1$ $-45$ $7$ $-23$	ss of Es = 1, $p$ = $l_0$ = $96$ = $24$ = $51$	schenbur $1 = -2,$ $l_1$ $-36$ $11$ $24$	$\begin{array}{c} \text{g-Kruggel spaces} \\ s_2 = 19/60 \\ \hline \\ -139/280 \\ -129/280 \\ -17/40 \\ \end{array}$		
sum  1 1 1 1 1 1 1 1 1	with $r$ $k_0$ $r$	ism class $ s  = 5$ , $s$ $k_1$ 16  11  15  23  25 $-4$	$   \begin{array}{c}     \text{ss of Es} \\     \text{s} = 1, \ p \\     l_0 \\     \hline     -37 \\     -27 \\     -46 \\     -29 \\     -54 \\     -27 \\   \end{array} $	chenburg 1 = -2, -1 1 = -2, -1 1 = -2, -1 1 = -35 1 = -35 1 = -26 1 = -26	F-Kruggel spaces $s_2 = 7/30$ $s_1$ $-139/280$ $-129/280$ $-17/40$ $-109/280$ $-99/280$ $-89/280$	sum  -1 -1 -1 -1 -1 -1 -1	with $ r  k_0$ 97  27  75  85  44  117	ism clas  =5, s] $k_1$ -45 7 -23 -33 -16 45	ss of Es = 1, $p$ $l_0$ 96 24 51 59 27 106	schenbur 1 = -2, $l_1$ -36 11 24 24 17 59	$\begin{array}{c} \text{g-Kruggel spaces} \\ s_2 = 19/60 \\ \hline \\ s_1 \\ \hline \\ -139/280 \\ -129/280 \\ -17/40 \\ -109/280 \\ -99/280 \\ -89/280 \end{array}$		
sum  1 1 1 1 1 1 1 1 1 1 1 1	with $r$ $k_0$ $-69$ $-34$ $-47$ $-55$ $-57$ $-29$ $-57$	ism clas  =5, s $k_1$ 16 11 15 23 25 -4 5	$\begin{array}{c} \text{ss of Es} \\ \text{s} = 1, \ p \\ l_0 \\ \hline -37 \\ -27 \\ -46 \\ -29 \\ -54 \\ -27 \\ -34 \end{array}$	chenburg $1 = -2, -2, -2, -2, -2, -2, -2, -2, -2, -2,$	F-Kruggel spaces $s_2 = 7/30$ $\begin{array}{r} s_1 \\ \hline -139/280 \\ -129/280 \\ -17/40 \\ -109/280 \\ -99/280 \\ -89/280 \\ -79/280 \end{array}$	sum  -1 -1 -1 -1 -1 -1 -1 -1	with $ r $ $k_0$ 97  27  75  85  44  117  91	ism clas $ =5, s]$ $k_1$ $-45$ $7$ $-23$ $-33$ $-16$ $45$ $14$	ss of Es = 1, $p$ $l_0$ 96 24 51 59 27 106 57	schenbur 1 = -2, $l_1$ -36 11 24 24 17 59 57	g-Kruggel spaces $s_2 = 19/60$ $s_1$ -139/280 -129/280 -17/40 -109/280 -99/280 -89/280 -79/280		
sum  1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	with $r$ $k_0$ $-69$ $-34$ $-47$ $-55$ $-57$ $-29$ $-57$ $-64$	ism clas  =5, s $k_1$ 16 11 15 23 25 -4 5 -26	$\begin{array}{c} \text{ss of Es} \\ \text{s} = 1, \ p \\ l_0 \\ \hline \\ -37 \\ -27 \\ -46 \\ -29 \\ -54 \\ -27 \\ -34 \\ -55 \end{array}$	chenburg $1 = -2, -2, -2, -2, -2, -2, -2, -2, -2, -2,$	$\begin{array}{c} \text{-Kruggel spaces} \\ s_2 = 7/30 \\ \hline & s_1 \\ \hline -139/280 \\ -129/280 \\ -17/40 \\ -109/280 \\ -99/280 \\ -89/280 \\ -79/280 \\ -69/280 \\ \hline -69/280 \end{array}$	sum  -1 -1 -1 -1 -1 -1 -1 -1 -1	with $ r $ $k_0$ 97  27  75  85  44  117  91  15	ism clas $ =5, s]$ $k_1$ $-45$ $7$ $-23$ $-33$ $-16$ $45$ $14$ $-3$	$ \begin{array}{c} \text{ss of Es} \\ = 1, \ p \\ l_0 \\ \hline 96 \\ 24 \\ 51 \\ 59 \\ 27 \\ 106 \\ 57 \\ 11 \end{array} $	schenbur 1 = -2, $l_1$ -36 11 24 24 17 59 57 4	$\begin{array}{c} \text{g-Kruggel spaces} \\ s_2 = 19/60 \\ & s_1 \\ \hline & -139/280 \\ & -129/280 \\ & -17/40 \\ & -109/280 \\ & -99/280 \\ & -89/280 \\ & -69/280 \\ & -69/280 \end{array}$		
sum  1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	with $r$ $k_0$ $-69$ $-34$ $-47$ $-55$ $-57$ $-29$ $-57$ $-64$ $-37$	ism class $  = 5$ , $s$ $k_1$ 16  11  15  23  25  -4  5  -26  13	$\begin{array}{c} \text{ss of Es} \\ \text{s} = 1, \ p \\ l_0 \\ \\ -37 \\ -27 \\ -46 \\ -29 \\ \\ -54 \\ -27 \\ -34 \\ -55 \\ -29 \end{array}$	chenburg 1 = -2, $11 = -2$ , $11 = -2$ , $11 = -351 = -261 = -261 = -71 = -29$	F-Kruggel spaces $s_2 = 7/30$ $\begin{array}{r} s_1 \\ \hline -139/280 \\ -129/280 \\ -17/40 \\ -109/280 \\ -99/280 \\ -89/280 \\ -89/280 \\ -69/280 \\ -69/280 \\ -59/280 \end{array}$	sum -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1	with $ r $ $k_0$ 97  27  75  85  44  117  91  15  47	ism clas $ =5, s]$ $k_1$ $-45$ $7$ $-23$ $-33$ $-16$ $45$ $14$ $-3$ $15$	$\begin{array}{c} \text{ss of Es} \\ = 1, \ p \\ l_0 \\ \hline \\ 96 \\ 24 \\ 51 \\ 59 \\ 27 \\ 106 \\ 57 \\ 11 \\ 44 \\ \end{array}$	schenbur 1 = -2, $l_1$ -36 11 24 24 17 59 57 4 19	$\begin{array}{c} \text{g-Kruggel spaces} \\ s_2 = 19/60 \\ \hline \\ s_1 \\ \hline \\ -139/280 \\ -129/280 \\ -17/40 \\ -109/280 \\ -99/280 \\ -89/280 \\ -79/280 \\ -69/280 \\ -59/280 \\ \end{array}$		
sum  1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	with $r$ $k_0$ $-69$ $-34$ $-47$ $-55$ $-57$ $-29$ $-57$ $-64$ $-37$ $-69$	ism class $  = 5$ , $s$ $k_1$ 16  11  15  23  25  -4  5  -26  13  34	$\begin{array}{c} \text{ss of Ess} \\ \text{s} = 1, \ p \\ l_0 \\ \\ -37 \\ -27 \\ -46 \\ -29 \\ -54 \\ -27 \\ -34 \\ -55 \\ -29 \\ -65 \end{array}$	chenburg 1 = -2, $-11 = -2$ , $-11 = -2$ , $-11 = -2$	F-Kruggel spaces $s_2 = 7/30$ $\begin{array}{r} s_1 \\ \hline -139/280 \\ -129/280 \\ -17/40 \\ -109/280 \\ -99/280 \\ -89/280 \\ -79/280 \\ -69/280 \\ -69/280 \\ -59/280 \\ -7/40 \\ \end{array}$	sum -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1	with $ r $ $k_0$ 97  27  75  85  44  117  91  15  47  76	$\begin{array}{c} \text{ism clas} \\  =5,s \\ \hline k_1 \\ \hline -45 \\ 7 \\ -23 \\ -33 \\ -16 \\ 45 \\ 14 \\ -3 \\ 15 \\ -16 \\ \end{array}$	$\begin{array}{c} \text{ss of Es} \\ = 1, \ p \\ l_0 \\ \hline \\ 96 \\ 24 \\ 51 \\ 59 \\ 27 \\ 106 \\ 57 \\ 11 \\ 44 \\ 75 \\ \end{array}$	schenbur 1 = -2, $l_1$ -36 11 24 24 17 59 57 4 19 -13	$\begin{array}{c} \text{g-Kruggel spaces} \\ s_2 = 19/60 \\ \hline \\ s_1 \\ \hline \\ -139/280 \\ -129/280 \\ -17/40 \\ -109/280 \\ -99/280 \\ -89/280 \\ -69/280 \\ -69/280 \\ -59/280 \\ -7/40 \\ \hline \end{array}$		
sum  1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	with $r$ $k_0$ $-69$ $-34$ $-47$ $-55$ $-57$ $-29$ $-57$ $-64$ $-37$ $-69$ $-24$	$\begin{array}{c} \text{ism class} \\  =5, s \\ \hline \\ 16 \\ 11 \\ 15 \\ 23 \\ 25 \\ -4 \\ 5 \\ -26 \\ 13 \\ 34 \\ 6 \end{array}$	$\begin{array}{c} \text{ss of Es} \\ \text{s} = 1, \ p \\ l_0 \\ \hline \\ -37 \\ -27 \\ -46 \\ -28 \\ -54 \\ -27 \\ -34 \\ -25 \\ -29 \\ -65 \\ -17 \\ \end{array}$	chenburg 1 = -2, $-2$ , $-11111111$	$\begin{array}{c} \text{-Kruggel spaces} \\ s_2 = 7/30 \\ \hline s_1 \\ \hline -139/280 \\ -129/280 \\ -17/40 \\ -109/280 \\ -99/280 \\ -89/280 \\ -89/280 \\ -69/280 \\ -69/280 \\ -59/280 \\ -7/40 \\ -39/280 \\ \end{array}$	sum  -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1	$\begin{array}{c} \text{with }  r \\ \hline \\ 80 \\ \hline \\ 97 \\ 27 \\ 75 \\ 85 \\ 44 \\ 117 \\ 91 \\ 15 \\ 47 \\ 76 \\ 26 \\ \end{array}$	$\begin{array}{c} \text{ism clas} \\  =5,s \\ \hline k_1 \\ \hline -45 \\ 7 \\ -23 \\ -33 \\ -16 \\ 45 \\ 14 \\ -3 \\ 15 \\ -16 \\ -6 \\ \end{array}$	$\begin{array}{c} \text{ss of Es} \\ = 1, \ p \\ l_0 \\ \hline \\ 96 \\ 24 \\ 51 \\ 59 \\ 27 \\ 106 \\ 57 \\ 11 \\ 44 \\ 75 \\ 25 \\ \end{array}$	schenbur 1 = -2, $l_1$ -36 11 24 17 59 57 4 19 -13 -3	$\begin{array}{c} \text{g-Kruggel spaces} \\ s_2 = 19/60 \\ \hline \\ s_1 \\ \hline \\ -139/280 \\ -129/280 \\ -17/40 \\ -109/280 \\ -99/280 \\ -89/280 \\ -79/280 \\ -69/280 \\ -59/280 \\ -7/40 \\ -39/280 \\ \end{array}$		
sum  1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	with $ r $ $k_0$ $-69$ $-34$ $-47$ $-55$ $-57$ $-29$ $-57$ $-64$ $-37$ $-69$ $-24$ $-86$	ism class $  = 5$ , $s$ $k_1$ 16  11  15  23  25  -4  5  -26  13  34	$\begin{array}{c} \text{ss of Ess} \\ \text{s} = 1, \ p \\ l_0 \\ \\ -37 \\ -27 \\ -46 \\ -29 \\ -54 \\ -27 \\ -34 \\ -55 \\ -29 \\ -65 \end{array}$	chenburg $1 = -2$ , $1$ $1$ $1$ $1$ $1$ $1$ $1$ $1$ $1$ $1$	F-Kruggel spaces $s_2 = 7/30$ $\begin{array}{r} s_1 \\ \hline -139/280 \\ -129/280 \\ -17/40 \\ -109/280 \\ -99/280 \\ -89/280 \\ -79/280 \\ -69/280 \\ -69/280 \\ -59/280 \\ -7/40 \\ -39/280 \\ -29/280 \\ \end{array}$	sum -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1	with $ r $ $k_0$ 97  27  75  85  44  117  91  15  47  76	$\begin{array}{c} \text{ism clas} \\  =5,s \\ \hline k_1 \\ \hline -45 \\ 7 \\ -23 \\ -33 \\ -16 \\ 45 \\ 14 \\ -3 \\ 15 \\ -16 \\ \end{array}$	$\begin{array}{c} \text{ss of Es} \\ = 1, \ p \\ l_0 \\ \hline \\ 96 \\ 24 \\ 51 \\ 59 \\ 27 \\ 106 \\ 57 \\ 11 \\ 44 \\ 75 \\ \end{array}$	schenbur 1 = -2, $l_1$ -36 11 24 24 17 59 57 4 19 -13 -3 -3	$\begin{array}{c} \text{g-Kruggel spaces} \\ s_2 = 19/60 \\ \hline \\ s_1 \\ \hline \\ -139/280 \\ -129/280 \\ -17/40 \\ -109/280 \\ -99/280 \\ -89/280 \\ -79/280 \\ -69/280 \\ -59/280 \\ -7/40 \\ -39/280 \\ -29/280 \\ \end{array}$		
sum  1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	with $r$ $k_0$ $-69$ $-34$ $-47$ $-55$ $-57$ $-29$ $-57$ $-64$ $-37$ $-69$ $-24$	$\begin{array}{c} \text{ism clas} \\  =5, s \\ \frac{k_1}{16} \\ \hline \\ 16 \\ 11 \\ 15 \\ 23 \\ 25 \\ -4 \\ 5 \\ -26 \\ 13 \\ 34 \\ 6 \\ 36 \\ \end{array}$	$\begin{array}{c} \text{ss of Es} \\ \text{s} = 1, \ p \\ l_0 \\ \hline \\ -37 \\ -27 \\ -46 \\ -29 \\ -54 \\ -27 \\ -34 \\ -55 \\ -29 \\ -65 \\ -17 \\ -77 \end{array}$	chenburg $1 = -2$ , $1$ $1$ $1$ $1$ $1$ $1$ $1$ $1$ $1$ $1$	$\begin{array}{c} \text{-Kruggel spaces} \\ s_2 = 7/30 \\ \hline s_1 \\ \hline -139/280 \\ -129/280 \\ -17/40 \\ -109/280 \\ -99/280 \\ -89/280 \\ -89/280 \\ -69/280 \\ -69/280 \\ -59/280 \\ -7/40 \\ -39/280 \\ \end{array}$	sum  -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1	$\begin{array}{c} \text{with }  r \\ \hline \\ 97 \\ 27 \\ 75 \\ 85 \\ 44 \\ 117 \\ 91 \\ 15 \\ 47 \\ 76 \\ 26 \\ 91 \end{array}$	$\begin{array}{c} \text{ism clas} \\  =5,s \\ k_1 \\ \hline \\ -45 \\ 7 \\ -23 \\ -33 \\ -16 \\ 45 \\ 14 \\ -3 \\ 15 \\ -16 \\ -6 \\ -36 \\ \end{array}$	$\begin{array}{c} \text{ss of Es} \\ = 1, \ p \\ l_0 \\ \hline \\ 96 \\ 24 \\ 51 \\ 59 \\ 27 \\ 106 \\ 57 \\ 11 \\ 44 \\ 75 \\ 25 \\ 85 \\ \end{array}$	schenbur 1 = -2, $l_1$ -36 11 24 17 59 57 4 19 -13 -3	$\begin{array}{c} \text{g-Kruggel spaces} \\ s_2 = 19/60 \\ \hline \\ s_1 \\ \hline \\ -139/280 \\ -129/280 \\ -17/40 \\ -109/280 \\ -99/280 \\ -89/280 \\ -79/280 \\ -69/280 \\ -59/280 \\ -7/40 \\ -39/280 \\ \end{array}$		
sum  1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	$\begin{array}{c} \text{with }   r \\ k_0 \\ \hline \\ -69 \\ -34 \\ -47 \\ -55 \\ -57 \\ -29 \\ -57 \\ -64 \\ -37 \\ -69 \\ -24 \\ -86 \\ -14 \\ -35 \\ -16 \end{array}$	$\begin{array}{c} \text{ism class} \\  =5, s \\ k_1 \\ \hline \\ 16 \\ 11 \\ 15 \\ 23 \\ 25 \\ -4 \\ 5 \\ -26 \\ 13 \\ 34 \\ 6 \\ 36 \\ 4 \\ 13 \\ 6 \\ \end{array}$	$\begin{array}{c} \text{ss of Es} \\ \text{s} = 1, p \\ l_0 \\ \\ -37 \\ -27 \\ -28 \\ -29 \\ -28 \\ -29 \\ -29 \\ -34 \\ -55 \\ -27 \\ -34 \\ -55 \\ -17 \\ -77 \\ -7 \\ -7 \\ -21 \\ -15 \end{array}$	chenburg $1 = -2$ , $l_1$ $-35$ $-35$ $-26$ $-26$ $-11$ $-7$ $-39$ $-39$ $-6$ $-6$ $-13$ $-7$ $-7$ $-7$ $-7$ $-7$ $-7$ $-14$ $-14$ $-14$ $-14$ $-14$ $-14$	$\begin{array}{c} \text{-Kruggel spaces} \\ s_2 = 7/30 \\ \hline \\ s_1 \\ \hline \\ -139/280 \\ -129/280 \\ -17/40 \\ -109/280 \\ -99/280 \\ -89/280 \\ -69/280 \\ -69/280 \\ -69/280 \\ -59/280 \\ -7/40 \\ -39/280 \\ -29/280 \\ -19/280 \\ -9/280 \\ 1/280 \\ \end{array}$	sum  -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1	$\begin{array}{c} \text{with }  r\\ k_0\\ \hline \\ 97\\ 27\\ 75\\ 85\\ 44\\ 117\\ 91\\ 15\\ 47\\ 76\\ 26\\ 91\\ 116\\ 174\\ 25\\ \end{array}$	$\begin{array}{l} \text{ism clas} \\  =5,s \\ k_1 \\ \hline \\ -45 \\ 7 \\ -23 \\ -33 \\ -16 \\ 45 \\ 14 \\ -3 \\ 15 \\ -16 \\ -6 \\ -36 \\ -16 \\ \end{array}$	$\begin{array}{c} \text{ss of Es} \\ = 1, \ p \\ l_0 \\ \\ 96 \\ 24 \\ 51 \\ 59 \\ 27 \\ 106 \\ 57 \\ 11 \\ 44 \\ 75 \\ 25 \\ 85 \\ 87 \\ 97 \\ 19 \\ \end{array}$	schenbur $1 = -2$ , $l_1$ -36 11 24 24 17 59 57 4 19 -13 -3 -13 35 77 4	$\begin{array}{c} \text{g-Kruggel spaces} \\ s_2 = 19/60 \\ \hline \\ & -139/280 \\ -129/280 \\ -17/40 \\ -109/280 \\ -99/280 \\ -89/280 \\ -79/280 \\ -69/280 \\ -79/280 \\ -740 \\ -39/280 \\ -29/280 \\ -19/280 \\ -9/280 \\ 1/280 \\ \end{array}$		
sum  1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	$\begin{array}{c} \text{with }   r \\ k_0 \\ \hline \\ -69 \\ -34 \\ -47 \\ -55 \\ -57 \\ -29 \\ -57 \\ -64 \\ -37 \\ -69 \\ -24 \\ -86 \\ -14 \\ -86 \\ -14 \\ -86 \\ -14 \\ -86 \\ -18 \\ -84 \\ \end{array}$	$\begin{array}{c} \text{ism class} \\  =5, s \\ k_1 \end{array}$ $\begin{array}{c} 16 \\ 11 \\ 15 \\ 23 \\ 25 \\ -4 \\ 13 \\ 34 \\ 6 \\ 36 \\ 4 \\ 13 \\ 6 \\ 26 \end{array}$	$\begin{array}{c} \text{ss of Es} \\ \text{s} = 1, \ p \\ l_0 \\ \\ \text{-37} \\ \text{-27} \\ \text{-46} \\ \text{-68} \\ \text{-29} \\ \text{-55} \\ \text{-29} \\ \text{-65} \\ \text{-67} \\ \text{-77} \\ \text{-77} \\ \text{-7} \\ \text{-78} \\ \text{-10} \\ -1$	chenburg $1 = -2$ , $l_1$ $l_2$ $l_3$ $l_4$ $l_5$ $l_6$ $l_7$ $l_8$	$\begin{array}{c} \text{-Kruggel spaces} \\ s_2 = 7/30 \\ \hline \\ s_1 \\ \hline \\ -139/280 \\ -129/280 \\ -17/40 \\ -109/280 \\ -99/280 \\ -89/280 \\ -69/280 \\ -69/280 \\ -69/280 \\ -7/40 \\ -39/280 \\ -29/280 \\ -19/280 \\ -9/280 \\ -19/280 \\ -19/280 \\ -19/280 \\ 1/280 \\ 11/280 \\ \end{array}$	sum  -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1	$\begin{array}{c} \text{with }   r \\ \hline \\ 80 \\ \hline \\ 97 \\ 27 \\ 75 \\ 85 \\ 44 \\ 117 \\ 91 \\ 15 \\ 47 \\ 76 \\ 26 \\ 91 \\ 116 \\ 174 \\ 25 \\ 19 \\ \end{array}$	$\begin{array}{l} \text{ism clas} \\  =5,s \\ k_1 \\ \hline \\ -45,\\ -45,\\ -23,\\ -33,\\ -16,\\ 45,\\ -16,\\ -6,\\ -36,\\ -16,\\ -6,\\ -36,\\ -16,\\ -14,\\ -3,\\ 15,\\ -16,\\ -6,\\ -36,\\ -16,\\ -14,\\ -3,\\ 15,\\ -16,\\ -4,\\ -3,\\ 15,\\ -16,\\ -4,\\ -3,\\ -16,\\ -4,\\ -3,\\ -16,\\ -4,\\ -3,\\ -16,\\ -4,\\ -3,\\ -16,\\ -4,\\ -3,\\ -16,\\ -4,\\ -3,\\ -16,\\ -4,\\ -3,\\ -16,\\ -4,\\ -3,\\ -16,\\ -4,\\ -4,\\ -4,\\ -4,\\ -4,\\ -4,\\ -4,\\ -4$	$\begin{array}{c} \text{ss of Es} \\ = 1, \ p \\ l_0 \\ \\ 96 \\ 24 \\ 51 \\ 59 \\ 27 \\ 106 \\ 57 \\ 11 \\ 44 \\ 75 \\ 25 \\ 85 \\ 87 \\ 97 \\ 19 \\ 17 \\ \end{array}$	schenbur $1 = -2$ , $l_1$ $-36$ $11$ $24$ $24$ $17$ $59$ $57$ $4$ $19$ $-13$ $-3$ $35$ $77$ $4$ $7$	$\begin{array}{c} \text{rg-Kruggel spaces} \\ s_2 = 19/60 \\ \hline \\ & -139/280 \\ -129/280 \\ & -17/40 \\ -109/280 \\ & -99/280 \\ & -99/280 \\ & -79/280 \\ & -69/280 \\ & -59/280 \\ & -7/40 \\ & -39/280 \\ & -29/280 \\ & -19/280 \\ & -9/280 \\ & -19/280 \\ & -19/280 \\ & -1/280 \\ & 1/280 \\ \end{array}$		
sum  1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	$\begin{array}{c} \text{with }   r \\ k_0 \\ \hline \\ -69 \\ -34 \\ -47 \\ -55 \\ -57 \\ -29 \\ -57 \\ -64 \\ -37 \\ -69 \\ -24 \\ -86 \\ -14 \\ -35 \\ -16 \\ -84 \\ -25 \\ \end{array}$	$\begin{array}{c} \text{ism class} \\  =5, s \\ k_1 \\ \hline \\ 16 \\ 11 \\ 15 \\ 23 \\ 25 \\ -4 \\ 6 \\ 13 \\ 34 \\ 6 \\ 36 \\ 4 \\ 13 \\ 6 \\ 26 \\ 13 \\ \end{array}$	$\begin{array}{c} \text{ss of Es} \\ \text{s} = 1, \ p \\ l_{\text{C}} \\ \\ -37 \\ -27 \\ -46 \\ -29 \\ -54 \\ -27 \\ -34 \\ -55 \\ -29 \\ -65 \\ -17 \\ -7 \\ -7 \\ -21 \\ -18 \\ -57 \\ -24 \end{array}$	chenburg $1 = -2$ , $\frac{1}{1}$ , $\frac{1}{2}$ , $\frac{1}{3}$ , $\frac{1}{4}$ , $\frac$	$\begin{array}{l} \text{-Kruggel spaces} \\ s_2 = 7/30 \\ \hline \\ s_1 \\ \hline \\ -139/280 \\ -129/280 \\ -17/40 \\ -109/280 \\ -99/280 \\ -89/280 \\ -79/280 \\ -69/280 \\ -59/280 \\ -7/40 \\ -39/280 \\ -29/280 \\ -19/280 \\ -19/280 \\ -9/280 \\ 1/280 \\ 1/280 \\ 1/280 \\ 3/40 \\ \end{array}$	sum  -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1	$\begin{array}{c} \text{with }  r \\ \hline \\ 80 \\ \hline \\ 97 \\ 27 \\ 75 \\ 85 \\ 44 \\ 117 \\ 91 \\ 15 \\ 47 \\ 76 \\ 26 \\ 91 \\ 116 \\ 174 \\ 25 \\ 19 \\ 107 \\ \end{array}$	$\begin{array}{l} \text{ism clas} \\  =5,s\\ \hline k_1 \\ \hline \\ -45 \\ \hline \\ 7 \\ -23 \\ -33 \\ -16 \\ 45 \\ 14 \\ -3 \\ 15 \\ -16 \\ -6 \\ -36 \\ -16 \\ -74 \\ -13 \\ 4 \\ -43 \\ \end{array}$	$\begin{array}{c} \text{ss of Es} \\ = 1, \ p \\ l_0 \\ \hline \\ 96 \\ 24 \\ 51 \\ 59 \\ 27 \\ 106 \\ 57 \\ 11 \\ 44 \\ 75 \\ 25 \\ 87 \\ 97 \\ 19 \\ 17 \\ 84 \\ \end{array}$	schenbur $1 = -2$ , $l_1$ $-36$ $11$ $24$ $24$ $17$ $59$ $57$ $4$ $19$ $-13$ $-3$ $-13$ $35$ $77$ $4$ $7$ $16$	$\begin{array}{c} \text{rg-Kruggel spaces} \\ s_2 = 19/60 \\ \hline \\ s_1 \\ \hline \\ -139/280 \\ -129/280 \\ -17/40 \\ -109/280 \\ -99/280 \\ -89/280 \\ -79/280 \\ -69/280 \\ -59/280 \\ -7/40 \\ -39/280 \\ -29/280 \\ -19/280 \\ -19/280 \\ 1/280 \\ 1/280 \\ 11/280 \\ 3/40 \\ \end{array}$		
sum  1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	$\begin{array}{c} \text{with }   r \\ k_0 \\ \hline \\ -69 \\ -34 \\ -47 \\ -55 \\ -57 \\ -29 \\ -29 \\ -64 \\ -37 \\ -69 \\ -24 \\ -86 \\ -14 \\ -35 \\ -16 \\ -84 \\ -25 \\ -75 \\ \end{array}$	$\begin{array}{c} \text{ism class} \\  =5,s\\ k_1 \\ \hline \\ 16\\ 11\\ 15\\ 23\\ 25\\ -26\\ 13\\ 34\\ 6\\ 36\\ 4\\ 13\\ 36\\ 6\\ 26\\ 13\\ -7\\ \end{array}$	$\begin{array}{c} \text{SSS of Es} \\ \text{SSS of Es} \\$	chenburg $1 = -2$ , $l_1$ $-35$ $-35$ $11$ $-7$ $-14$ $-29$ $-6$ $13$ $-7$ $-7$ $-14$ $-2$ $-7$ $-14$ $-2$ $-7$ $-14$ $-17$ $-17$ $-17$ $-17$ $-18$ $-$	$\begin{array}{c} \text{-Kruggel spaces} \\ s_2 = 7/30 \\ \hline \\ s_1 \\ \hline \\ -139/280 \\ -129/280 \\ -129/280 \\ -19/280 \\ -99/280 \\ -89/280 \\ -69/280 \\ -69/280 \\ -69/280 \\ -7/40 \\ -39/280 \\ -29/280 \\ -19/280 \\ -19/280 \\ -9/280 \\ 1/280 \\ 11/280 \\ 3/40 \\ 31/280 \\ \end{array}$	sum  -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1	$\begin{array}{c} \text{with }  r\\ k_0 \\ \hline \\ 97\\ 27\\ 75\\ 85\\ 44\\ 117\\ 91\\ 15\\ 47\\ 6\\ 26\\ 91\\ 116\\ 25\\ 19\\ 107\\ 44\\ \end{array}$	$\begin{array}{l} \text{ism clas} \\  =5,s \\ \hline k_1 \\ \hline \\ -45 \\ \hline \\ 7 \\ -23 \\ -33 \\ -16 \\ 45 \\ 14 \\ -3 \\ 15 \\ -16 \\ -6 \\ -36 \\ -16 \\ -74 \\ -13 \\ 4 \\ -43 \\ 16 \\ \end{array}$	$\begin{array}{c} \text{ss of Es} \\ = 1, \ p \\ l_0 \\ \hline \\ 96 \\ 24 \\ 51 \\ 59 \\ 27 \\ 106 \\ 57 \\ 11 \\ 44 \\ 75 \\ 25 \\ 85 \\ 87 \\ 97 \\ 19 \\ 17 \\ 84 \\ 35 \\ \end{array}$	schenbur $1 = -2$ , $l_1$ $-36$ $11$ $24$ $24$ $17$ $59$ $57$ $4$ $19$ $-13$ $35$ $77$ $4$ $7$ $16$ $27$	$\begin{array}{c} \text{rg-Kruggel spaces} \\ s_2 = 19/60 \\ \hline \\ & -139/280 \\ & -129/280 \\ & -17/40 \\ & -109/280 \\ & -99/280 \\ & -89/280 \\ & -79/280 \\ & -69/280 \\ & -79/280 \\ & -7/40 \\ & -39/280 \\ & -19/280 \\ & -19/280 \\ & -19/280 \\ & -9/280 \\ & 1/280 \\ & 1/280 \\ & 3/40 \\ & 3/40 \end{array}$		
sum  1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	$\begin{array}{c} \text{with }   r \\ k_0 \\ \hline \\ -69 \\ -344 \\ -47 \\ -55 \\ -57 \\ -29 \\ -57 \\ -64 \\ -37 \\ -69 \\ -24 \\ -86 \\ -14 \\ -36 \\ -16 \\ -84 \\ -25 \\ -75 \\ -61 \\ \end{array}$	$\begin{array}{c} \text{ism class} \\  =5, \varepsilon \\ \hline \\ k_1 \\ \hline \\ 16 \\ 16 \\ 11 \\ 15 \\ 23 \\ 25 \\ -4 \\ 5 \\ -26 \\ 61 \\ 34 \\ 63 \\ 6 \\ 44 \\ 13 \\ 6 \\ 26 \\ 13 \\ -7 \\ 4 \\ \end{array}$	$\begin{array}{c} \text{SS of Es} \\ SS of E$	chenburg $1 = -2$ , $l_1$ $l_2$ $l_3$ $l_4$ $l_5$ $l_6$ $l_7$ $l_8$	F-Kruggel spaces $s_2 = 7/30$ $\begin{array}{r} s_1 \\ \hline -139/280 \\ -129/280 \\ -17/40 \\ -109/280 \\ -99/280 \\ -99/280 \\ -89/280 \\ -69/280 \\ -69/280 \\ -69/280 \\ -7/40 \\ -39/280 \\ -29/280 \\ -19/280 \\ -19/280 \\ -19/280 \\ 11/280 \\ 3/40 \\ 31/280 \\ 41/280 \\ \end{array}$	sum  -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1	$\begin{array}{c} \text{with }  r\\ k_0\\ \hline \\ 97\\ 27\\ 75\\ 85\\ 44\\ 117\\ 91\\ 15\\ 47\\ 76\\ 26\\ 91\\ 116\\ 174\\ 25\\ 19\\ 107\\ 44\\ 74\\ \end{array}$	$\begin{aligned} &\text{ism clas} \\ &= 5, s \\ &{k_1} \end{aligned} \\ &{-45} \\ &{7} \\ &{-23} \\ &{-33} \\ &{-16} \\ &{45} \\ &{15} \\ &{-16} \\ &{-66} \\ &{-16} \\ &{-13} \\ &{4} \\ &{-43} \\ &{16} \\ &{-6} \end{aligned}$	$\begin{array}{c} \text{ss of Es} \\ = 1, \ p \\ l_0 \\ \hline \\ 96 \\ 24 \\ 51 \\ 59 \\ 27 \\ 106 \\ 57 \\ 11 \\ 44 \\ 75 \\ 25 \\ 85 \\ 87 \\ 97 \\ 19 \\ 17 \\ 84 \\ 35 \\ 45 \\ \end{array}$	schenbur $1 = -2$ , $l_1$ $-36$ $11$ $24$ $24$ $17$ $59$ $57$ $4$ $19$ $-13$ $-3$ $-13$ $35$ $77$ $4$ $7$ $16$ $27$ $37$	$\begin{array}{c} \text{rg-Kruggel spaces} \\ s_2 = 19/60 \\ \hline \\ & -139/280 \\ -129/280 \\ -17/40 \\ -109/280 \\ -99/280 \\ -99/280 \\ -69/280 \\ -69/280 \\ -59/280 \\ -7/40 \\ -39/280 \\ -29/280 \\ -19/280 \\ -19/280 \\ 11/280 \\ 3/40 \\ 31/280 \\ 41/280 \\ \end{array}$		
sum  1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	$\begin{array}{c} \text{with }   r \\ k_0 \\ \hline \\ -69 \\ -34 \\ -47 \\ -55 \\ -57 \\ -29 \\ -57 \\ -64 \\ -37 \\ -69 \\ -24 \\ -86 \\ -16 \\ -84 \\ -25 \\ -75 \\ -61 \\ -27 \\ \end{array}$	$\begin{array}{c} \text{ism class} \\  =5,  \varepsilon \\ k_1 \\ \hline \\ 16 \\ 11 \\ 15 \\ 23 \\ 25 \\ -24 \\ 5 \\ -26 \\ 13 \\ 34 \\ 66 \\ 36 \\ 4 \\ 13 \\ 66 \\ 26 \\ 613 \\ -7 \\ -4 \\ 13 \\ \end{array}$	$\begin{array}{c} \text{ss of Es} \\ \text{s} = 1, p \\ l_0 \\ \\ -27 \\ -46 \\ -29 \\ -54 \\ -27 \\ -34 \\ -27 \\ -34 \\ -27 \\ -34 \\ -27 \\ -34 \\ -27 \\ -34 \\ -27 \\ -34 \\ -27 \\ -34 \\ -25 \\ -29 \\ -65 \\ -17 \\ -77 \\ -21 \\ -15 \\ -57 \\ -24 \\ -56 \\ -45 \\ -24 \\ -56 \\ -24 \\ -25 \\ -25 \\$	chenburg $1 = -2$ , $\frac{1}{1}$ , $\frac{1}$ , $\frac{1}{1}$ , $\frac{1}{1}$ , $\frac{1}{1}$ , $\frac{1}{1}$ , $\frac{1}{1}$ , $\frac{1}$	$\begin{array}{l} \text{-Kruggel spaces} \\ s_2 = 7/30 \\ \hline \\ & -139/280 \\ & -129/280 \\ & -17/40 \\ & -109/280 \\ & -99/280 \\ & -89/280 \\ & -79/280 \\ & -69/280 \\ & -69/280 \\ & -69/280 \\ & -7/40 \\ & -39/280 \\ & -29/280 \\ & -19/280 \\ & -19/280 \\ & -19/280 \\ & 1/280 \\ & 1/280 \\ & 3/40 \\ & 31/280 \\ & 41/280 \\ & 51/280 \\ \hline \end{array}$	sum  -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1	$\begin{array}{c} \text{with }  r\\ \hline \\ 80\\ \hline \\ 97\\ 27\\ 75\\ 85\\ 44\\ 117\\ 91\\ 15\\ 47\\ 76\\ 26\\ 91\\ 116\\ 174\\ 25\\ 107\\ 44\\ 74\\ 87\\ \end{array}$	$\begin{array}{l} \text{ism clas} \\  =5,s \\ \hline k_1 \\ \hline \\ -45 \\ 7 \\ -23 \\ -33 \\ -36 \\ 45 \\ 15 \\ -16 \\ -6 \\ -36 \\ -16 \\ -6 \\ -36 \\ -14 \\ -13 \\ 15 \\ -43 \\ 16 \\ -6 \\ 5 \\ \end{array}$	$\begin{array}{c} \text{ss of Es} \\ = 1, \ p \\ l_0 \\ \hline \\ 96 \\ 24 \\ 51 \\ 59 \\ 27 \\ 106 \\ 57 \\ 11 \\ 44 \\ 75 \\ 25 \\ 85 \\ 87 \\ 97 \\ 19 \\ 17 \\ 84 \\ 35 \\ 45 \\ 59 \\ \end{array}$	schenbur $1 = -2$ , $l_1$ $l_1$ $l_2$ $l_3$ $l_4$ $l_4$ $l_4$ $l_5$ $l_6$ $l_7$ $l_8$	$\begin{array}{c} \text{rg-Kruggel spaces} \\ s_2 = 19/60 \\ \hline \\ s_1 \\ \hline \\ -139/280 \\ -129/280 \\ -17/40 \\ -109/280 \\ -99/280 \\ -89/280 \\ -79/280 \\ -69/280 \\ -79/280 \\ -7/40 \\ -39/280 \\ -29/280 \\ -19/280 \\ -19/280 \\ 1/280 \\ 11/280 \\ 3/40 \\ 31/280 \\ 41/280 \\ 51/280 \\ \end{array}$		
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Table 7, continued from previous page

		C	L		Table 7, continued i	rom prev	ious page	C41	44-		
home	omorphi			ires on a ienburg-I	Kruggel spaces	home	omorphis		n structi		a -Kruggel spaces
nome				=-2, s							2 = 29/60
sum	$k_0$	$k_1$	$l_0$	$l_1$	$s_1$	sum	$k_0$	$k_1$	$l_0$	$l_1$	$s_1$
0	-104	36	-91	-1	-139/280	1	-39	-1	-32	-12	-139/280
0	-188	49	-184	36	-129/280	1	-72	28	-51	-19	-129/280
0	-72	-4	-68	-11	-17/40	1	-80	-12	-51	-49	-17/40
0	-184 $-111$	$\frac{48}{27}$	$-171 \\ -104$	12 8	-109/280 $-99/280$	1 1	-49 -20	19 8	$-27 \\ -11$	$-22 \\ -9$	-109/280 $-99/280$
0	$-111 \\ -52$	16	-104 -51	12	-89/280 $-89/280$	1	-20 $-81$	11	-75	$-9 \\ -2$	-89/280 $-89/280$
0	-76	-13	-52	-44	-79/280	1	-111	51	-107	28	-79/280
0	-44	-24	-36	-33	-69/280	1	-41	21	-40	13	-69/280
0	-84	-52	-76	-61	-59/280	1	-115	48	-89	-19	-59/280
0	-204	16	-181	-28	-7/40	1	-12	5	-11	1	-7/40
0	$-192 \\ -196$	$\frac{76}{47}$	$-156 \\ -164$	$-21 \\ -24$	$-39/280 \\ -29/280$	1 1	$-59 \\ -71$	$^{1}_{-9}$	$-40 \\ -52$	$-27 \\ -35$	-39/280 $-29/280$
0	-190 -24	8	-104 -23	4	-29/280 -19/280	1	-119	49	-32 $-112$	-33 20	-19/280
ő	-161	37	-144	-4	-9/280	1	-160	68	-89	-71	-9/280
0	-192	56	-173	4	1/280	1	-39	-11	-32	-20	1/280
0	-133	-31	-124	-44	11/280	1	-90	38	-89	31	11/280
0	-204	88	-196	47	3/40	1	-40	13	-39	9	3/40
0	$-333 \\ -112$	9 36	$-232 \\ -101$	$-144 \\ 4$	$\frac{31/280}{41/280}$	1 1	$-27 \\ -31$	$-12 \\ 11$	$-21 \\ -27$	$-19 \\ 0$	$\frac{31/280}{41/280}$
0	-84	-32	-81	-36	51/280	1	-109	41	-75	-32	51/280
0	-51	12	-44	-4	61/280	1	-39	-19	-32	-27	61/280
0	-264	-32	-183	-141	71/280	1	-79	19	-75	8	71/280
0	-244	76	-141	-108	81/280	1	-107	-22	-69	-69	81/280
0	$-124 \\ -304$	28	-116	$^{7}_{-71}$	13/40	1 1	$-67 \\ -99$	-40	$-59 \\ -92$	$-49 \\ 13$	13/40
0	-304 -148	136 29	$-221 \\ -92$	-64	101/280 $111/280$	1	-99 -49	39 21	-92 -35	-12	101/280 $111/280$
0	-164	48	-161	37	121/280	1	-91	41	-72	-12	121/280
0	-144	16	-141	9	131/280	1	-99	-59	-92	-67	131/280
				ires on a					n struct		
home		sm clas	s of Esch	enburg-I	Kruggel spaces	home		m class	s of Esch	nenburg	-Kruggel spaces
	with	sm clas r =5,	s of Esch $s = 2, p_1$	enburg-I $_1 = 2, s_2$	= 0/1		with $ r $	= 5, s	s of Esch $s = 2, p_1$	nenburg $= 2, s_1$	-Kruggel spaces $_2 = 1/12$
sum	with $k_0$	sm clas $r  = 5,$ $k_1$	s of Esch $s = 2, p_1$ $l_0$	tenburg-I $l_1 = 2, s_2$ $l_1$	$= 0/1$ $s_1$	sum	with $ r $	$ =5, s$ $k_1$	s of Esch $s = 2, p_1$ $l_0$	nenburg $l_1$ = 2, $s_2$	-Kruggel spaces $_2 = 1/12$ $_{s_1}$
sum 0	with	sm clas $r  = 5,$ $k_1$ $12$	s of Esch $s = 2, p_1$ $l_0$ $l_0$	nenburg-I $l_1 = 2, s_2$ $l_1$	$\frac{s_1}{-33/70}$	sum 1	with $r$ $k_0$ $-77$	sm class $ =5, s]$ $k_1$ 29	s of Esch $s = 2, p_1$ $l_0$ $-75$	nenburg $l_1 = 2, s_1$ $l_1$	-Kruggel spaces $2 = 1/12$ $\begin{array}{c} s_1 \\ \hline -33/70 \end{array}$
0 0	with   k <sub>0</sub>   -33   -124	sm clas $r  = 5,$ $k_1$ $12$ $-13$	s of Esch $s = 2, p_1$ $l_0$ $-32$ $-112$	nenburg-I $l_1 = 2, s_2$ $l_1$ $l_1$ $l_2$ $l_3$	$ \begin{array}{c}                                     $	sum 1 1	with $ r $ $k_0$ $-77$ $-124$	sm class $ =5, s]$ $k_1$ $29$ $40$	s of Esch $s = 2, p_1$ $l_0$ -75 -111	nenburg $l_1 = 2$ , $s_2 = l_1$ $l_1 = 20$ $l_2 = 3$	-Kruggel spaces $_{2}=1/12$ $_{2}$ $_{3}$ $_{1}$ $_{-33/70}$ $_{-61/140}$
sum 0	with	sm clas $r  = 5,$ $k_1$ $12$	s of Esch $s = 2, p_1$ $l_0$ $l_0$	nenburg-I $l_1 = 2, s_2$ $l_1$	$\frac{s_1}{-33/70}$	sum 1	with $r$ $k_0$ $-77$	sm class $ =5, s]$ $k_1$ 29	s of Esch $s = 2, p_1$ $l_0$ $-75$	nenburg $l_1 = 2, s_1$ $l_1$	-Kruggel spaces $s_2 = 1/12$ $s_1$ $s_1$ $s_1$ $s_1$ $s_1$ $s_1$ $s_2$ $s_3/70$ $s_1/40$ $s_2/5$
0 0 0 0 0 0	with $\begin{vmatrix} k_0 \end{vmatrix}$ $-33 \\ -124 \\ -152 \\ -112 \\ -52 \\ \end{vmatrix}$	sm clas $r  = 5, \\ k_1$ 12  -13  -52  4  -12	s of Esch $s = 2, p_1$ $l_0$ -32 -112 -109 -68 -44	nenburg-H $l_1 = 2, s_2$ $l_1$ $l_1$ $s_1$ $s_2$ $s_3$ $s_4$ $s_2$ $s_3$ $s_4$ $s_4$ $s_4$ $s_4$ $s_4$ $s_5$ $s_4$ $s_5$ $s_4$ $s_5$ s	$= 0/1$ $s_1$ $-33/70$ $-61/140$ $-2/5$ $-51/140$ $-23/70$	1 1 1 1 1 1	with $ r $ $k_0$ -77  -124  -17  -70  -91	$\begin{array}{c} \text{sm class} \\   = 5, \ s \\ \hline k_1 \\ \hline \\ 29 \\ 40 \\ -1 \\ -30 \\ 9 \end{array}$	s of Esch $s = 2, p_1$ $l_0$ -75 -111 -10 -61 -75	nenburg = 2, section = 2, section = 2, section = 20 $\frac{3}{3}$ $\frac{-10}{-41}$ $\frac{-20}{3}$	-Kruggel spaces $_2=1/12$ $s_1$ $-33/70$ $-61/140$ $-2/5$ $-51/140$ $-23/70$
0 0 0 0 0 0	with $\begin{vmatrix} k_0 \\ k_0 \end{vmatrix}$ $-33 \\ -124 \\ -152 \\ -112 \\ -52 \\ -148 \\ \end{vmatrix}$	sm clas $r  = 5, \\ k_1$ 12  -13  -52  4  -12  71	s of Esch $s = 2, p_1$ $l_0$ -32 -112 -109 -68 -44 -132	tenburg-Henburg-I $l_1 = 2, s_2$ $l_1$ $l_2$ $l_3$ $l_4$ $l_4$ $l_5$ $l_6$ $l_7$ $l_8$	$= 0/1$ $\begin{array}{r} s_1 \\ \hline -33/70 \\ -61/140 \\ -2/5 \\ -51/140 \\ -23/70 \\ -41/140 \\ \end{array}$	sum  1 1 1 1 1 1 1 1 1 1	with $ r $ $k_0$ -77  -124  -17  -70  -91  -19	$\begin{array}{c} \text{sm class} \\  =5, s \\ \hline k_1 \\ \hline \\ 29 \\ 40 \\ -1 \\ -30 \\ 9 \\ 0 \\ \end{array}$	s of Esch $s = 2, p_1$ $l_0$ -75 -111 -61 -75 -11	nenburg $= 2, s_1$ $= 20$ $= 3$ $= -10$ $= -41$ $= -20$ $= -11$	$ \begin{array}{c} \text{-Kruggel spaces} \\ 2 = 1/12 \\ \hline \\ & \begin{array}{c} s_1 \\ \hline \\ -33/70 \\ -61/140 \\ -2/5 \\ -51/140 \\ -23/70 \\ -41/140 \end{array} $
sum 0 0 0 0 0 0 0 0 0 0 0 0	with $\begin{vmatrix} k_0 \end{vmatrix}$ $-33$ $-124$ $-152$ $-112$ $-52$ $-148$ $-193$	sm clas r  = 5, $k_1$ 12 -13 -52 4 -12 71 92	s of Esch $s = 2, p_1$ $l_0$ -32 -112 -109 -68 -44 -132 -132	senburg-I $l_1 = 2, s_2$ $l_1$ $l_1$ $l_2$ $l_3$ $l_4$ l	= 0/1 $-33/70$ $-61/140$ $-2/5$ $-51/140$ $-23/70$ $-41/140$ $-9/35$	sum  1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	with $ r $ $k_0$ -77  -124  -17  -70  -91  -19  -44	sm class $ =5, s]$ $k_1$ $29$ $40$ $-1$ $-30$ $9$ $0$ $5$	$\begin{array}{c} \text{s of Esch} \\ \text{s} = 2, \ p_1 \\ l_0 \\ \hline \\ -75 \\ -111 \\ -10 \\ -61 \\ -75 \\ -11 \\ -27 \\ \end{array}$	nenburg $l = 2, s_2$ $l_1$ 20 3 -10 -41 -20 -11 -21	$ \begin{array}{c} \text{-Kruggel spaces} \\ 2 = 1/12 \\ \hline \\ -33/70 \\ -61/140 \\ -2/5 \\ -51/140 \\ -23/70 \\ -41/140 \\ -9/35 \\ \end{array} $
sum 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	with $\begin{vmatrix} k_0 \end{vmatrix}$ $-33$ $-124$ $-152$ $-112$ $-52$ $-148$ $-193$ $-79$	sm clas r =5, $k_1$ 12 -13 -52 4 -12 71 92 -28	s of Esch $s = 2, p_1$ $l_0$ -32 -112 -109 -68 -44 -132 -132 -76	senburg-I $l_1 = 2, s_2$ $l_1$ $l_1$ $l_2$ $l_3$ $l_4$ l	= 0/1 $-33/70$ $-61/140$ $-2/5$ $-51/140$ $-23/70$ $-41/140$ $-9/35$ $-31/140$	sum  1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	with $ r $ $k_0$ -77  -124  -17  -70  -91  -19  -44  -59		$\begin{array}{c} \text{s of Esch} \\ \text{s} = 2, \ p_1 \\ l_0 \\ \\ -75 \\ -111 \\ -10 \\ -61 \\ -75 \\ -11 \\ -27 \\ -41 \end{array}$	nenburg $l = 2, s = l_1$ $l_1$ $l_2$ $l_3$ $l_4$ l	
sum 0 0 0 0 0 0 0 0 0 0 0 0	with $\begin{vmatrix} k_0 \end{vmatrix}$ $-33$ $-124$ $-152$ $-112$ $-52$ $-148$ $-193$	sm clas r  = 5, $k_1$ 12 -13 -52 4 -12 71 92	s of Esch $s = 2, p_1$ $l_0$ -32 -112 -109 -68 -44 -132 -132	senburg-I $l_1 = 2, s_2$ $l_1$ $l_1$ $l_2$ $l_3$ $l_4$ l	$= \overline{0/1}$ $-33/70$ $-61/140$ $-2/5$ $-51/140$ $-23/70$ $-41/140$ $-9/35$ $-31/140$ $-13/70$	sum  1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	with $ r $ $k_0$ -77  -124  -17  -70  -91  -19  -44	sm class $ =5, s]$ $k_1$ $29$ $40$ $-1$ $-30$ $9$ $0$ $5$	$\begin{array}{c} \text{s of Esch} \\ \text{s} = 2, \ p_1 \\ l_0 \\ \hline \\ -75 \\ -111 \\ -10 \\ -61 \\ -75 \\ -11 \\ -27 \\ \end{array}$	nenburg $l = 2, s_2$ $l_1$ 20 3 -10 -41 -20 -11 -21	$ \begin{array}{c} \text{-Kruggel spaces} \\ 2 = 1/12 \\ \hline \\ & \begin{array}{c} s_1 \\ \hline \\ -33/70 \\ -61/140 \\ -2/5 \\ -51/140 \\ -23/70 \\ -41/140 \\ -9/35 \\ -31/140 \\ -13/70 \end{array} $
sum 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	with $\begin{vmatrix} k_0 \end{vmatrix}$ $-33 \\ -124 \\ -152 \\ -112 \\ -52 \\ -148 \\ -193 \\ -79 \\ -68 \\ $	sm clas $r =5, \frac{k_1}{k_1}$ $12$ $-13$ $-52$ $4$ $-12$ $71$ $92$ $-28$ $31$	$s = 2, p_1$ $l_0$ $-32$ $-112$ $-109$ $-68$ $-44$ $-132$ $-132$ $-76$ $-52$	$\begin{array}{c} \text{nenburg-I} \\ 1 = 2, \ s_2 \\ l_1 \\ \hline \\ 8 \\ -32 \\ -103 \\ -59 \\ -23 \\ 8 \\ -56 \\ -32 \\ -12 \\ \end{array}$	= 0/1 $-33/70$ $-61/140$ $-2/5$ $-51/140$ $-23/70$ $-41/140$ $-9/35$ $-31/140$	sum  1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	with $ r $ $k_0$ -77  -124  -17  -70  -91  -19  -44  -59  -151	sm class $ =5, s]$ $k_1$ $ =5, s]$ $k_1$ $ =5, s]$ $k_1$ $ =5, s]$	$\begin{array}{c} \text{s of Esch} \\ \text{s} = 2, \ p_1 \\ l_0 \\ \hline \\ -75 \\ -111 \\ -10 \\ -61 \\ -75 \\ -11 \\ -27 \\ -41 \\ -140 \\ -140 \\ -41 \\ \end{array}$	nenburg $= 2, s_1$ = 20 = 3 = 10 = 41 = 20 = 11 = 21 = 21 = 21	
sum 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	$\begin{array}{c} \text{with} \mid k_0 \\ \hline -33 \\ -124 \\ -152 \\ -112 \\ -52 \\ -148 \\ -193 \\ -79 \\ -68 \\ -56 \\ -116 \\ -12 \\ \end{array}$	sm clas $r = 5$ , $\frac{k_1}{k_1}$ 12 -13 -52 4 -12 71 92 -28 31 8 -52 4	$\begin{array}{c} \text{s of Esch} \\ s = 2,  p_1 \\ l_0 \\ \hline \\ -32 \\ -112 \\ -109 \\ -68 \\ -44 \\ -132 \\ -76 \\ -52 \\ -53 \\ -89 \\ -9 \\ \end{array}$	senburg-I $1 = 2, s_2$ $l_1$ 8 -32 -103 -59 -23 8 -56 -32 -12 1 -83 -3	$= \overline{0/1}$ $-33/70$ $-61/140$ $-2/5$ $-51/140$ $-23/70$ $-41/140$ $-9/35$ $-31/140$ $-13/70$ $-3/20$ $-4/35$ $-11/140$	sum  1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	with $ r $ $k_0$ -77  -124  -17  -70  -91  -19  -44  -59  -151  -141  -54  -21	$\begin{array}{c} \text{sm class} \\  =5, s \\ \hline \\ 29 \\ 40 \\ -1 \\ -30 \\ 9 \\ 0 \\ 5 \\ 10 \\ 69 \\ 69 \\ 5 \\ 9 \end{array}$	$\begin{array}{c} \text{s of Escl} \\ \text{s} = 2, \ p_1 \\ l_0 \\ \hline \\ -75 \\ -111 \\ -10 \\ -61 \\ -75 \\ -11 \\ -27 \\ -41 \\ -140 \\ -140 \\ -41 \\ -20 \\ \end{array}$	nenburg $= 2$ , $s$ , $= 1$ , $= 20$ $= 3$ $= -10$ $= -41$ $= -20$ $= -11$ $= -21$ $= -21$ $= -21$ $= -17$ $= -1$	-Kruggel spaces $_2=1/12$ $\begin{array}{r} s_1 \\ -33/70 \\ -61/140 \\ -2/5 \\ -51/140 \\ -23/70 \\ -41/140 \\ -9/35 \\ -31/140 \\ -13/70 \\ -3/20 \\ -4/35 \\ -11/140 \end{array}$
sum 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	$\begin{array}{c} \text{with} \mid_{k_0} \\ -33 \\ -124 \\ -152 \\ -112 \\ -52 \\ -148 \\ -193 \\ -68 \\ -56 \\ -116 \\ -12 \\ -123 \end{array}$	sm clas $r =5$ , $\frac{k_1}{k_1}$ 12 -13 -52 4 -12 71 92 -28 31 8 -52 4 -33	$\begin{array}{c} \text{s of Esch} \\ s = 2,  p_{2} \\ l_{0} \\ \hline \\ -32 \\ -112 \\ -109 \\ -68 \\ -44 \\ -132 \\ -76 \\ -52 \\ -53 \\ -89 \\ -9 \\ -92 \\ \end{array}$	tenburg-II $1 = 2, s_2$ $l_1$ $8$ $-32$ $-103$ $-59$ $-23$ $8$ $-56$ $-32$ $-12$ $1$ $-83$ $-3$ $-72$	$= \overline{0/1}$ $-33/70$ $-61/140$ $-2/5$ $-51/140$ $-23/70$ $-41/140$ $-9/35$ $-31/140$ $-13/70$ $-3/20$ $-4/35$ $-11/140$ $-3/70$	sum  1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	$\begin{array}{c} \text{with} \   r \\ k_0 \\ \hline \\ -77 \\ -124 \\ -17 \\ -70 \\ -91 \\ -19 \\ -44 \\ -59 \\ -151 \\ -141 \\ -54 \\ -21 \\ -27 \\ \end{array}$	$\begin{array}{c} \text{sm class} \\  =5, s \\  =5, s \\ \hline \\ 29 \\ 40 \\ -1 \\ -30 \\ 9 \\ 0 \\ 5 \\ 10 \\ 69 \\ 69 \\ 5 \\ 9 \\ -11 \\ \end{array}$	$\begin{array}{c} \text{s of Esch} \\ \text{s} = 2,  p_1 \\ l_0 \\ \hline \\ -75 \\ -111 \\ -10 \\ -61 \\ -75 \\ -11 \\ -27 \\ -41 \\ -140 \\ -140 \\ -441 \\ -20 \\ -20 \\ -20 \\ \end{array}$	nenburg $= 2$ , $s_2$ $= \frac{1}{l_1}$ $= 20$ $= \frac{3}{3}$ $= -10$ $= -41$ $= -20$ $= -11$ $= -21$ $= 21$ $= 21$ $= 56$ $= -17$ $= -19$	$ \begin{array}{c} \text{-Kruggel spaces} \\ 2 = 1/12 \\ \hline \\ & -33/70 \\ -61/140 \\ & -2/5 \\ -51/140 \\ -23/70 \\ -41/140 \\ -9/35 \\ -31/140 \\ -13/70 \\ -4/35 \\ -11/140 \\ -3/70 \end{array} $
sum 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	$\begin{array}{c} \text{with} \mid_{k_0} \\ \\ -33 \\ -124 \\ -152 \\ -112 \\ -52 \\ -148 \\ -193 \\ -79 \\ -68 \\ -56 \\ -116 \\ -12 \\ -123 \\ -233 \\ \end{array}$	sm clas $r =5$ , $\frac{k_1}{k_1}$ 12 -13 -52 4 -12 71 92 -28 31 8 -52 4 -33 76	$\begin{array}{c} \text{s of Esch} \\ s=2,p; \\ l_0 \\ \hline -32 \\ -112 \\ -109 \\ -68 \\ -44 \\ -132 \\ -76 \\ -52 \\ -53 \\ -89 \\ -9 \\ -92 \\ -172 \\ \end{array}$	enburg-II $1 = 2, s_2$ $1$ $8$ $-32$ $-103$ $-59$ $-23$ $8$ $-56$ $-32$ $-12$ $1$ $-83$ $-3$ $-72$ $-56$	$= \overline{0/1}$ $-33/70$ $-61/140$ $-2/5$ $-51/140$ $-23/70$ $-41/140$ $-9/35$ $-31/140$ $-13/70$ $-3/20$ $-4/35$ $-11/140$ $-3/70$ $-1/140$	sum  1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	$\begin{array}{c} \text{with }   r \\ k_0 \\ \hline \\ -77 \\ -124 \\ -17 \\ -70 \\ -91 \\ -19 \\ -44 \\ -59 \\ -151 \\ -141 \\ -54 \\ -21 \\ -27 \\ -61 \\ \end{array}$	$\begin{array}{c} \text{sm class} \\  =5, s \\ \hline \\ & 29 \\ 40 \\ -1 \\ -30 \\ & 9 \\ 0 \\ 5 \\ 10 \\ 69 \\ 69 \\ 5 \\ 9 \\ -11 \\ 29 \\ \end{array}$	$\begin{array}{c} \text{s of Esch} \\ \text{s} = 2, \ p_1 \\ l_0 \\ \hline \\ -75 \\ -111 \\ -10 \\ -61 \\ -75 \\ -11 \\ -27 \\ -41 \\ -140 \\ -140 \\ -41 \\ -20 \\ -60 \\ \end{array}$	nenburg $= 2, s_1$ $= 20$ $= 3$ $= -10$ $= -20$ $= -11$ $= -21$ $= -21$ $= -21$ $= -17$ $= -19$ $= 21$	
sum 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	$\begin{array}{c} \text{with} \mid_{1} \\ \hline -33 \\ -124 \\ -152 \\ -112 \\ -52 \\ -118 \\ -193 \\ -79 \\ -68 \\ -56 \\ -116 \\ -12 \\ -123 \\ -233 \\ -233 \\ -172 \\ \end{array}$	$\begin{array}{c} \text{sm clas} \\ r =5, \\ k_1 \\ \hline \\ 12 \\ -13 \\ -52 \\ 4 \\ -12 \\ 71 \\ 92 \\ -28 \\ 31 \\ 8 \\ -52 \\ 4 \\ -33 \\ 76 \\ 84 \\ \end{array}$	$\begin{array}{c} \text{s of Esch} \\ s=2,  p; \\ l_0 \\ \hline \\ -32 \\ -112 \\ -109 \\ -68 \\ -44 \\ -132 \\ -76 \\ -52 \\ -53 \\ -89 \\ -9 \\ -92 \\ -172 \\ -133 \\ \end{array}$	enburg-I $_1=2,s_2$ $\frac{l_1}{l_1}$ 8 $-32$ $-103$ $-59$ $-23$ 8  8 $-56$ $-32$ $-12$ $1$ $-83$ $-3$ $-72$ $-56$ $-28$	$= \overline{0/1}$ $-33/70$ $-61/140$ $-2/5$ $-51/140$ $-23/70$ $-41/140$ $-9/35$ $-31/140$ $-13/70$ $-3/20$ $-4/35$ $-11/140$ $-3/70$ $-1/140$ $1/35$	sum  1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	$\begin{array}{c} \text{with} \   r \\ k_0 \end{array}$ $\begin{array}{c} -77 \\ -124 \\ -17 \\ -70 \\ -91 \\ -19 \\ -151 \\ -151 \\ -21 \\ -27 \\ -61 \\ -157 \end{array}$	$\begin{array}{c} \text{sm class} \\  =5,s \\ \hline \\ 29 \\ 40 \\ -1 \\ -30 \\ 9 \\ 0 \\ 5 \\ 10 \\ 69 \\ 69 \\ 5 \\ 9 \\ -11 \\ 29 \\ -1 \end{array}$	$\begin{array}{c} \text{s of Esch} \\ \text{s} = 2, \ p_1 \\ \hline \\ l_0 \\ \hline \\ -75 \\ -111 \\ -10 \\ -61 \\ -75 \\ -11 \\ -27 \\ -41 \\ -140 \\ -140 \\ -41 \\ -20 \\ -20 \\ -20 \\ -150 \\ \end{array}$	nenburg $= 2, s$ : $\frac{l_1}{200}$ $= 200$ $= 20$	$ \begin{array}{c} \text{-Kruggel spaces} \\ 2 = 1/12 \\ \hline \\ & -33/70 \\ -61/140 \\ & -2/5 \\ -51/140 \\ -23/70 \\ -41/140 \\ -9/35 \\ -31/140 \\ -13/70 \\ -3/20 \\ -4/35 \\ -11/140 \\ -3/70 \\ -1/140 \\ 1/35 \end{array} $
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sum 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	$\begin{array}{c} \text{with} \mid \\ k_0 \\ \hline \\ -33 \\ -124 \\ -152 \\ -112 \\ -52 \\ -148 \\ -193 \\ -79 \\ -68 \\ -56 \\ -112 \\ -233 \\ -233 \\ -323 \\ -172 \\ -164 \\ -52 \\ -112 \\ -152 \\ \end{array}$	$\begin{array}{l} \text{sm clas} \\ r =5, \\ \hline k_1 \\ \hline \\ 12 \\ -13 \\ -52 \\ 4 \\ -12 \\ 71 \\ 92 \\ -28 \\ 31 \\ 8 \\ -52 \\ 4 \\ -33 \\ 76 \\ 84 \\ -33 \\ 76 \\ 84 \\ 4 \\ 68 \\ \end{array}$	$\begin{array}{c} \text{s of Esch} \\ s=2, p; \\ l_0 \\ \hline \\ -32 \\ -112 \\ -109 \\ -68 \\ -44 \\ -132 \\ -76 \\ -52 \\ -53 \\ -89 \\ -92 \\ -172 \\ -133 \\ -152 \\ -43 \\ -103 \\ -108 \\ \end{array}$	enburg-I $_1=2,s_2$ $l_1=2,s_2$ $l_1$ -32 -103 -59 -23 -56 -32 -12 1 -83 -72 -56 -28 -16 -28 -16 -28 -16 -28 -28 -38 -39 -	= 0/1 $-33/70$ $-61/140$ $-2/5$ $-51/140$ $-23/70$ $-41/140$ $-9/35$ $-31/140$ $-13/70$ $-3/20$ $-4/35$ $-11/140$ $-3/70$ $-1/140$ $1/35$ $9/140$ $1/10$ $19/140$ $6/35$	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	$\begin{array}{c} \text{with} \   r \\ k_0 \\ \hline \\ -77 \\ -124 \\ -17 \\ -70 \\ -91 \\ -19 \\ -44 \\ -59 \\ -151 \\ -141 \\ -54 \\ -21 \\ -27 \\ -61 \\ -157 \\ -91 \\ -75 \\ -101 \\ -57 \\ \end{array}$	$\begin{array}{l} \text{sm class} \\  =5,s \\ \hline \\ k_1 \\ \hline \\ 29 \\ 40 \\ -1 \\ -30 \\ 9 \\ 0 \\ 5 \\ 10 \\ 69 \\ 69 \\ 69 \\ 69 \\ 5 \\ 9 \\ -111 \\ 29 \\ -1 \\ 3 \\ 20 \\ 43 \\ 9 \end{array}$	$\begin{array}{c} \text{s of Escl} \\ \text{s} = 2, \ p_1 \\ \hline \\ -0 \\ -75 \\ -111 \\ -10 \\ -61 \\ -75 \\ -11 \\ -27 \\ -41 \\ -140 \\ -140 \\ -40 \\ -20 \\ -60 \\ -75 \\ -61 \\ -90 \\ -40 \\ \end{array}$	nenburg $= 2, s$ ; $l_1$ $= 20$ $3$ $-10$ $-41$ $-20$ $-11$ $-21$ $-21$ $56$ $-17$ $5$ $-19$ $-21$ $-14$ $-24$ $-11$ $5$ $-20$	$ \begin{array}{c} \text{-Kruggel spaces} \\ 2 = 1/12 \\ \hline \\ & -33/70 \\ -61/140 \\ & -2/5 \\ -51/140 \\ -23/70 \\ -41/140 \\ -9/35 \\ -31/140 \\ -13/70 \\ -3/20 \\ -4/35 \\ -11/140 \\ -3/70 \\ -1/140 \\ 1/35 \\ 9/140 \\ 1/10 \\ 19/140 \\ 6/35 \\ \end{array} $
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sum 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	$\begin{array}{c} \text{with} \mid \\ k_0 \\ \hline \\ -33 \\ -124 \\ -152 \\ -112 \\ -52 \\ -148 \\ -193 \\ -79 \\ -68 \\ -56 \\ -116 \\ -12 \\ -123 \\ -233 \\ -2172 \\ -164 \\ -52 \\ -112 \\ -152 \\ -93 \\ -212 \\ -93 \\ -212 \end{array}$	$\begin{array}{l} \text{sm clas} \\ r =5, \\ \hline k_1 \\ \hline 12 \\ -13 \\ -52 \\ 4 \\ -12 \\ -13 \\ -52 \\ -14 \\ -12 \\ -28 \\ 311 \\ 8 \\ -52 \\ -28 \\ 4 \\ -33 \\ 76 \\ 84 \\ 7 \\ 24 \\ 4 \\ 688 \\ 36 \\ 68 \\ \end{array}$	$\begin{array}{c} \text{s of Esch} \\ s=2,p; \\ \hline \\ lo \\ \hline \\ -32 \\ -112 \\ -109 \\ -68 \\ -44 \\ -132 \\ -76 \\ -52 \\ -53 \\ -89 \\ -92 \\ -92 \\ -172 \\ -133 \\ -152 \\ -133 \\ -103 \\ -188 \\ -103 \\ -188 \\ -103 \\ -104 \\ -103 \\ -108 \\ -1$	enburg-I $_1=2$ , $s_2$ $s_1=2$ , $s_2$ $s_2=103$ $s_3=103$ $s_3=103$ $s_4=103$ $s_3=103$ $s_4$	$= \overline{0/1}$ $-33/70$ $-61/140$ $-2/5$ $-51/140$ $-23/70$ $-41/140$ $-9/35$ $-31/140$ $-13/70$ $-3/20$ $-4/35$ $-11/140$ $-3/70$ $-1/140$ $1/35$ $9/140$ $1/10$ $19/140$ $6/35$ $29/140$ $17/70$	sum  1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	$\begin{array}{c} \text{with} \   r \\ k_0 \\ \hline \\ -77 \\ -124 \\ -17 \\ -70 \\ -91 \\ -19 \\ -44 \\ -59 \\ -151 \\ -141 \\ -54 \\ -21 \\ -27 \\ -61 \\ -157 \\ -91 \\ -157 \\ -91 \\ -157 \\ -91 \\ -57 \\ -75 \\ -101 \\ -57 \\ -141 \\ -57 \\ -151 \\ -151 \\ -51 \\ \end{array}$	$\begin{array}{l} \text{sm class} \\   = 5,  s \\ \hline k_1 \\ \hline 29 \\ 40 \\ -1 \\ -30 \\ 9 \\ 0 \\ 5 \\ 10 \\ 69 \\ 69 \\ 5 \\ 9 \\ -11 \\ 29 \\ -1 \\ 30 \\ 243 \\ 9 \\ 443 \\ 9 \\ 49 \\ 23 \\ \end{array}$	$\begin{array}{c} \text{s of Escl} \\ \text{s} = 2, \ p_1 \\ l_0 \\ \\ -75 \\ -111 \\ -10 \\ -61 \\ -75 \\ -11 \\ -27 \\ -41 \\ -140 \\ -140 \\ -40 \\ -20 \\ -20 \\ -20 \\ -60 \\ -150 \\ -75 \\ -61 \\ -90 \\ -40 \\ -139 \\ -44 \\ \end{array}$	nenburg $= 2, s$ ; $l_1$ 20 3 $-10$ $-41$ $-20$ $-11$ $-21$ $-21$ $56$ $-17$ $5$ $-19$ $21$ $-14$ $-24$ $-11$ $5$ $-20$ $0$ $0$ $0$	$\begin{array}{c} \text{-Kruggel spaces} \\ 2 = 1/12 \\ \hline \\ & s_1 \\ \hline \\ & -33/70 \\ & -61/140 \\ & -2/5 \\ & -51/140 \\ & -23/70 \\ & -41/140 \\ & -9/35 \\ & -31/140 \\ & -13/70 \\ & -3/20 \\ & -4/35 \\ & -11/140 \\ & -3/70 \\ & -1/140 \\ & 1/35 \\ & 9/140 \\ & 1/10 \\ & 6/35 \\ & 29/140 \\ & 17/70 \\ \hline \end{array}$
sum 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	$\begin{array}{c} \text{with} \mid \\ k_0 \\ \hline \\ -33 \\ -124 \\ -152 \\ -112 \\ -52 \\ -148 \\ -193 \\ -79 \\ -68 \\ -56 \\ -112 \\ -123 \\ -233 \\ -172 \\ -164 \\ -52 \\ -112 \\ -152 \\ -93 \\ -212 \\ -173 \\ -213 \\ -$	$\begin{array}{l} \text{sm clas} \\ r =5, \\ k_1 \\ \hline 12 \\ -13 \\ -52 \\ 4 \\ -12 \\ 71 \\ 92 \\ -28 \\ 31 \\ 8 \\ -52 \\ 4 \\ -33 \\ 76 \\ 84 \\ 7 \\ 24 \\ 4 \\ 68 \\ 36 \\ 68 \\ 52 \\ \end{array}$	$\begin{array}{c} \text{s of Esch} \\ s=2, p; \\ l_0 \\ \hline \\ -32 \\ -112 \\ -109 \\ -68 \\ -44 \\ -132 \\ -76 \\ -52 \\ -53 \\ -89 \\ -92 \\ -172 \\ -133 \\ -152 \\ -433 \\ -108 \\ -72 \\ -188 \\ -72 \\ -188 \\ -72 \\ -188 \\ -172 \\ \end{array}$	enburg-I $_1=2,\ s_2$ $l_1=2,\ s_2$ $l_1$ $\frac{8}{8}$ -32 -103 -59 -23 8 -56 -32 -12 1 -83 -72 -58 -72 -58 -16 -28 -16 -28 -16	= 0/1 $-33/70$ $-61/140$ $-2/5$ $-51/140$ $-23/70$ $-41/140$ $-9/35$ $-31/140$ $-13/70$ $-3/20$ $-4/35$ $-11/140$ $-3/70$ $-1/140$ $1/35$ $9/140$ $1/10$ $19/140$ $6/35$ $29/140$ $17/70$ $39/140$	sum  1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	$\begin{array}{c} \text{with} \   r \\ k_0 \\ \hline \\ -77 \\ -124 \\ -17 \\ -70 \\ -91 \\ -19 \\ -44 \\ -59 \\ -151 \\ -141 \\ -54 \\ -21 \\ -27 \\ -61 \\ -157 \\ -91 \\ -75 \\ -101 \\ -57 \\ -141 \\ -57 \\ -141 \\ -57 \\ -141 \\ -107 \\ \end{array}$	$\begin{array}{l} \text{sm class} \\  =5,s \\ \hline k_1 \\ \hline \\ 29 \\ 40 \\ -1 \\ -30 \\ 9 \\ 0 \\ 5 \\ 10 \\ 69 \\ 69 \\ 69 \\ 69 \\ -11 \\ 29 \\ -11 \\ 29 \\ -1 \\ 3 \\ 20 \\ 43 \\ 9 \\ 49 \\ 23 \\ -1 \\ \end{array}$	$\begin{array}{c} \text{s of Escl} \\ \text{s} = 2, \ p_1 \\ \hline \\ 0 \\ \hline \\ -75 \\ -111 \\ -10 \\ -61 \\ -75 \\ -11 \\ -27 \\ -41 \\ -140 \\ -140 \\ -20 \\ -20 \\ -60 \\ -150 \\ -75 \\ -61 \\ -90 \\ -40 \\ -139 \\ -44 \\ -64 \\ \end{array}$	nenburg $= 2, s$ ; $l_1$ $= 2, s$ ; $l_1$ $= 20$ $= 3$ $= -10$ $= -11$ $= -21$ $= -21$ $= -21$ $= -21$ $= -14$ $= -24$ $= -11$ $= -20$ $= -20$ $= -20$ $= -60$	$\begin{array}{c} \text{-Kruggel spaces} \\ 2 = 1/12 \\ \hline \\ & -33/70 \\ -61/140 \\ & -2/5 \\ -51/140 \\ -2/5 \\ -51/140 \\ -9/35 \\ -31/140 \\ -9/35 \\ -31/140 \\ -13/70 \\ -3/20 \\ -4/35 \\ -11/140 \\ -3/70 \\ -1/140 \\ 1/35 \\ 9/140 \\ 1/10 \\ 19/140 \\ 6/35 \\ 29/140 \\ 17/70 \\ 39/140 \\ \end{array}$
sum 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	$\begin{array}{c} \text{with} \mid \\ k_0 \\ \hline \\ -33 \\ -124 \\ -152 \\ -112 \\ -52 \\ -148 \\ -193 \\ -79 \\ -68 \\ -56 \\ -112 \\ -123 \\ -212 \\ -112 \\ -152 \\ -912 \\ -112 \\ -152 \\ -93 \\ -2112 \\ -173 \\ -96 \\ -92 \\ \end{array}$	$\begin{array}{l} \text{sm clas} \\ r =5, \\ \hline k_1 \\ \hline 12 \\ -13 \\ -52 \\ 4 \\ -12 \\ -13 \\ -52 \\ -14 \\ -12 \\ -28 \\ 311 \\ 8 \\ -52 \\ -28 \\ 4 \\ -33 \\ 76 \\ 84 \\ 7 \\ 24 \\ 4 \\ 688 \\ 36 \\ 68 \\ \end{array}$	$\begin{array}{c} \text{s of Esch} \\ s=2,p; \\ \hline \\ 0 \\ \hline \\ -32 \\ -112 \\ -109 \\ -68 \\ -44 \\ -132 \\ -132 \\ -76 \\ -52 \\ -53 \\ -89 \\ -92 \\ -172 \\ -133 \\ -152 \\ -133 \\ -108 \\ -172 \\ -133 \\ -188 \\ -172 \\ -188 \\ -172 \\ -83 \\ \end{array}$	enburg-I $_1=2$ , $s_2$ $s_1=2$ , $s_2$ $s_2=103$ $s_3=103$ $s_3=103$ $s_4=103$ $s_3=103$ $s_4$	$= \overline{0/1}$ $-33/70$ $-61/140$ $-2/5$ $-51/140$ $-23/70$ $-41/140$ $-9/35$ $-31/140$ $-13/70$ $-3/20$ $-4/35$ $-11/140$ $-3/70$ $-1/140$ $1/35$ $9/140$ $1/10$ $19/140$ $6/35$ $29/140$ $17/70$ $39/140$ $17/70$ $39/140$ $11/35$ $7/20$	sum  1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	$\begin{array}{c} \text{with} \   r \\ k_0 \\ \hline \\ -77 \\ -124 \\ -17 \\ -70 \\ -91 \\ -19 \\ -44 \\ -49 \\ -151 \\ -141 \\ -54 \\ -21 \\ -27 \\ -61 \\ -157 \\ -91 \\ -75 \\ -101 \\ -57 \\ -101 \\ -57 \\ -107 \\ -51 \\ -107 \\ -51 \\ -80 \\ \end{array}$	$\begin{array}{l} \text{sm class} \\   = 5,  s \\ \hline k_1 \\ \hline 29 \\ 40 \\ -1 \\ -30 \\ 9 \\ 0 \\ 5 \\ 10 \\ 69 \\ 69 \\ 5 \\ 9 \\ -11 \\ 29 \\ -1 \\ 30 \\ 243 \\ 9 \\ 443 \\ 9 \\ 49 \\ 23 \\ \end{array}$	$\begin{array}{c} \text{s of Escl} \\ \text{s} = 2, \ p_1 \\ l_0 \\ \\ -75 \\ -111 \\ -10 \\ -61 \\ -75 \\ -11 \\ -27 \\ -41 \\ -140 \\ -140 \\ -40 \\ -20 \\ -20 \\ -60 \\ -150 \\ -75 \\ -61 \\ -90 \\ -40 \\ -130 \\ -40 \\ -130 \\ -40 \\ -130 \\ -51 \\ -51 \\ -64 \\ -35 \\ -51 \\ \end{array}$	nenburg $= 2, s$ ; $l_1$ 20 3 $-10$ $-41$ $-20$ $-11$ $-21$ $-21$ $56$ $-17$ $5$ $-19$ $21$ $-14$ $-24$ $-11$ $5$ $-20$ $0$ $0$ $0$	$\begin{array}{l} \text{-Kruggel spaces} \\ 2 = 1/12 \\ \hline \\ & s_1 \\ \hline \\ & -33/70 \\ & -61/140 \\ & -2/5 \\ & -51/140 \\ & -23/70 \\ & -41/140 \\ & -9/35 \\ & -31/140 \\ & -13/70 \\ & -3/20 \\ & -4/35 \\ & -11/140 \\ & -3/70 \\ & -1/140 \\ & 1/35 \\ & 9/140 \\ & 1/10 \\ & 6/35 \\ & 29/140 \\ & 17/70 \\ & 39/140 \\ & 11/35 \\ & 7/20 \\ \hline \end{array}$
sum 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	$\begin{array}{c} \text{with} \mid \\ k_0 \\ \hline \\ -33 \\ -124 \\ -152 \\ -112 \\ -52 \\ -148 \\ -193 \\ -79 \\ -68 \\ -56 \\ -112 \\ -123 \\ -233 \\ -172 \\ -164 \\ -52 \\ -1152 \\ -93 \\ -212 \\ -173 \\ -96 \\ -92 \\ -213 \\ \end{array}$	$\begin{array}{l} \text{sm clas} \\ r =5, \\ k_1 \\ \hline 12 \\ -13 \\ -52 \\ 4 \\ -12 \\ 71 \\ 92 \\ -28 \\ 31 \\ 8 \\ -52 \\ 4 \\ -33 \\ 76 \\ 84 \\ 4 \\ 4 \\ 68 \\ 368 \\ 68 \\ 52 \\ 28 \\ 44 \\ 36 \\ \end{array}$	$\begin{array}{c} \text{s of Esch} \\ s=2, p; \\ l_0 \\ \hline -32 \\ -112 \\ -109 \\ -68 \\ -44 \\ -132 \\ -76 \\ -52 \\ -53 \\ -89 \\ -92 \\ -172 \\ -133 \\ -152 \\ -43 \\ -103 \\ -108 \\ -72 \\ -84 \\ -83 \\ -172 \\ -84 \\ -83 \\ -116 \\ \end{array}$	enburg-I $_1=2,\ s_2$ $l_1$ 8  -32 -103 -59 -23 8 -56 -32 -12 1 -83 -72 -56 -44 -13 -39 -16 1 48 -3 7 -112	= 0/1 $-33/70$ $-61/140$ $-2/5$ $-51/140$ $-23/70$ $-41/140$ $-9/35$ $-31/140$ $-13/70$ $-3/20$ $-4/35$ $-11/140$ $-3/70$ $-1/140$ $1/35$ $9/140$ $1/10$ $19/140$ $6/35$ $29/140$ $17/70$ $39/140$ $11/35$ $7/20$ $27/70$	sum  1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	$\begin{array}{c} \text{with} \   r \\ k_0 \\ \hline \\ -77 \\ -124 \\ -17 \\ -70 \\ -91 \\ -19 \\ -44 \\ -59 \\ -151 \\ -141 \\ -54 \\ -21 \\ -27 \\ -61 \\ -157 \\ -91 \\ -75 \\ -101 \\ -57 \\ -141 \\ -51 \\ -107 \\ -51 \\ -107 \\ -41 \\ \end{array}$	$\begin{array}{l} \text{sm class} \\  =5,s \\ \hline k_1 \\ 29 \\ 40 \\ -1 \\ -30 \\ 9 \\ 0 \\ 5 \\ 10 \\ 69 \\ 69 \\ -11 \\ 29 \\ -11 \\ 3 \\ 20 \\ 43 \\ 9 \\ 443 \\ 9 \\ 49 \\ 23 \\ -1 \\ -1 \\ 21 \\ 29 \\ \end{array}$	$\begin{array}{c} \text{s of Escl} \\ \text{s} = 2, \ p_1 \\ \hline 0 \\ -75 \\ -111 \\ -10 \\ -61 \\ -75 \\ -11 \\ -27 \\ -41 \\ -140 \\ -140 \\ -20 \\ -20 \\ -60 \\ -150 \\ -75 \\ -61 \\ -90 \\ -40 \\ -139 \\ -44 \\ -35 \\ -51 \\ -35 \end{array}$	nenburg $= 2, s$ ; $l_1$ $= 2, s$ ; $l_1$ $= 3$ $= -10$ $= -11$ $= -21$ $= -21$ $= -21$ $= -21$ $= -21$ $= -14$ $= -24$ $= -11$ $= -20$ $= -24$ $= -11$ $= -20$ $= -60$ $= -24$ $= -31$ $= -4$	$\begin{array}{c} \text{-Kruggel spaces} \\ 2 = 1/12 \\ \hline \\ & -33/70 \\ -61/140 \\ -2/5 \\ -51/140 \\ -23/70 \\ -41/140 \\ -9/35 \\ -31/140 \\ -13/70 \\ -3/20 \\ -4/35 \\ -11/140 \\ -3/70 \\ -1/140 \\ 1/35 \\ 9/140 \\ 1/10 \\ 19/140 \\ 6/35 \\ 29/140 \\ 17/70 \\ 39/140 \\ 11/35 \\ 7/20 \\ 27/70 \\ \end{array}$
sum 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	$\begin{array}{c} \text{with} \mid_{k_0} \\ \hline -33 \\ -124 \\ -152 \\ -112 \\ -52 \\ -148 \\ -193 \\ -79 \\ -68 \\ -56 \\ -116 \\ -122 \\ -123 \\ -233 \\ -172 \\ -164 \\ -52 \\ -1152 \\ -93 \\ -2173 \\ -96 \\ -92 \\ -213 \\ -912 \\ -112 \\ \end{array}$	$\begin{array}{l} \text{sm clas} \\ r  = 5, \\ k_1 \\ \hline \\ 11 \\ \hline \\ 12 \\ -13 \\ -52 \\ 4 \\ -12 \\ 71 \\ \hline \\ 92 \\ -28 \\ 31 \\ 8 \\ -52 \\ 4 \\ -33 \\ 76 \\ 84 \\ \hline \\ 7 \\ 24 \\ 4 \\ 68 \\ 36 \\ 68 \\ 52 \\ 28 \\ 44 \\ 36 \\ 68 \\ 52 \\ 28 \\ 44 \\ 36 \\ 68 \\ 48 \\ \end{array}$	$\begin{array}{c} \text{s of Esch} \\ s=2,p; \\ l_0 \\ l_0 \\ \end{array}$ $\begin{array}{c} -32 \\ -112 \\ -109 \\ -68 \\ -44 \\ -132 \\ -76 \\ -52 \\ -53 \\ -89 \\ -9 \\ -92 \\ -172 \\ -133 \\ -152 \\ -43 \\ -103 \\ -1$	enburg-I $1=2,\ s_2$ $s_1=2,\ s_2$ $s_1=1$ $s_2=1$ $s_3=1$ $s$	= 0/1 $-33/70$ $-61/140$ $-2/5$ $-51/140$ $-23/70$ $-41/140$ $-9/35$ $-31/140$ $-13/70$ $-3/20$ $-4/35$ $-11/140$ $1/35$ $9/140$ $1/10$ $19/140$ $6/35$ $29/140$ $17/70$ $39/140$ $11/35$ $7/20$ $27/70$ $59/140$	sum  1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	$\begin{array}{c} \text{with} \   r \\ k_0 \\ \hline \\ -77 \\ -124 \\ -17 \\ -70 \\ -91 \\ -19 \\ -44 \\ -59 \\ -151 \\ -141 \\ -54 \\ -21 \\ -27 \\ -61 \\ -157 \\ -91 \\ -75 \\ -101 \\ -57 \\ -141 \\ -57 \\ -107 \\ -51 \\ -80 \\ -41 \\ -37 \\ \end{array}$	$\begin{array}{l} \text{sm class} \\   = 5,  s \\ \hline k_1 \\ 29 \\ 40 \\ -1 \\ -30 \\ 9 \\ 0 \\ 5 \\ 10 \\ 69 \\ 69 \\ 5 \\ 9 \\ -11 \\ 29 \\ -11 \\ 3 \\ 20 \\ 43 \\ 9 \\ 9 \\ 23 \\ -1 \\ -1 \\ 21 \\ 9 \\ 19 \end{array}$	$\begin{array}{l} \text{s of Escl} \\ \text{s} = 2, \ p_1 \\ l_0 \\ l_0 \\ -75 \\ -111 \\ -10 \\ -61 \\ -75 \\ -111 \\ -75 \\ -11 \\ -27 \\ -41 \\ -140 \\ -41 \\ -20 \\ -20 \\ -60 \\ -150 \\ -75 \\ -61 \\ -90 \\ -139 \\ -44 \\ -64 \\ -35 \\ -51 \\ -35 \\ -34 \\ \end{array}$	nenburg = 2, s:	
sum 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	$\begin{array}{c} \text{with} \mid \\ k_0 \\ \hline \\ -33 \\ -124 \\ -152 \\ -112 \\ -52 \\ -148 \\ -193 \\ -79 \\ -68 \\ -56 \\ -112 \\ -123 \\ -233 \\ -172 \\ -164 \\ -52 \\ -1152 \\ -93 \\ -212 \\ -173 \\ -96 \\ -92 \\ -213 \\ \end{array}$	$\begin{array}{l} \text{sm clas} \\ r =5, \\ k_1 \\ \hline 12 \\ -13 \\ -52 \\ 4 \\ -12 \\ 71 \\ 92 \\ -28 \\ 31 \\ 8 \\ -52 \\ 4 \\ -33 \\ 76 \\ 84 \\ 4 \\ 4 \\ 68 \\ 368 \\ 68 \\ 52 \\ 28 \\ 44 \\ 36 \\ \end{array}$	$\begin{array}{c} \text{s of Esch} \\ s=2, p; \\ l_0 \\ \hline \\ -32 \\ -112 \\ -109 \\ -68 \\ -44 \\ -132 \\ -76 \\ -52 \\ -53 \\ -89 \\ -92 \\ -172 \\ -133 \\ -152 \\ -43 \\ -103 \\ -108 \\ -72 \\ -84 \\ -83 \\ -172 \\ -84 \\ -83 \\ -116 \\ \end{array}$	enburg-I $_1=2,\ s_2$ $l_1$ 8  -32 -103 -59 -23 8 -56 -32 -12 1 -83 -72 -56 -44 -13 -39 -16 1 48 -3 7 -112	= 0/1 $-33/70$ $-61/140$ $-2/5$ $-51/140$ $-23/70$ $-41/140$ $-9/35$ $-31/140$ $-13/70$ $-3/20$ $-4/35$ $-11/140$ $-3/70$ $-1/140$ $1/35$ $9/140$ $1/10$ $19/140$ $6/35$ $29/140$ $17/70$ $39/140$ $11/35$ $7/20$ $27/70$	sum  1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	$\begin{array}{c} \text{with} \   r \\ k_0 \\ \hline \\ -77 \\ -124 \\ -17 \\ -70 \\ -91 \\ -19 \\ -44 \\ -59 \\ -151 \\ -141 \\ -54 \\ -21 \\ -27 \\ -61 \\ -157 \\ -91 \\ -75 \\ -101 \\ -57 \\ -141 \\ -51 \\ -107 \\ -51 \\ -107 \\ -41 \\ \end{array}$	$\begin{array}{l} \text{sm class} \\  =5,s \\ \hline k_1 \\ 29 \\ 40 \\ -1 \\ -30 \\ 9 \\ 0 \\ 5 \\ 10 \\ 69 \\ 69 \\ -11 \\ 29 \\ -11 \\ 3 \\ 20 \\ 43 \\ 9 \\ 443 \\ 9 \\ 49 \\ 23 \\ -1 \\ -1 \\ 21 \\ 29 \\ \end{array}$	$\begin{array}{c} \text{s of Escl} \\ \text{s} = 2, \ p_1 \\ \hline 0 \\ -75 \\ -111 \\ -10 \\ -61 \\ -75 \\ -11 \\ -27 \\ -41 \\ -140 \\ -140 \\ -20 \\ -20 \\ -60 \\ -150 \\ -75 \\ -61 \\ -90 \\ -40 \\ -139 \\ -44 \\ -35 \\ -51 \\ -35 \end{array}$	nenburg $= 2, s$ ; $l_1$ $= 2, s$ ; $l_1$ $= 3$ $= -10$ $= -11$ $= -21$ $= -21$ $= -21$ $= -21$ $= -21$ $= -14$ $= -24$ $= -11$ $= -20$ $= -24$ $= -11$ $= -20$ $= -60$ $= -24$ $= -31$ $= -4$	$\begin{array}{c} \text{-Kruggel spaces} \\ 2 = 1/12 \\ \hline \\ & -33/70 \\ -61/140 \\ -2/5 \\ -51/140 \\ -23/70 \\ -41/140 \\ -9/35 \\ -31/140 \\ -13/70 \\ -3/20 \\ -4/35 \\ -11/140 \\ -3/70 \\ -1/140 \\ 1/35 \\ 9/140 \\ 1/10 \\ 19/140 \\ 6/35 \\ 29/140 \\ 17/70 \\ 39/140 \\ 11/35 \\ 7/20 \\ 27/70 \\ \end{array}$

Table 7, continued from previous page

		C	h		Table 7, continued	nom prev	rous pag		41			_
home	omorphi			tures on	a -Kruggel spaces	home	omorph		th str			a -Kruggel spaces
nome				$p_1 = 2, s$		nome						$r_2 = 1/4$
sum	$k_0$	$k_1$	$l_0$	$l_1$	$s_1$	sum	$k_0$	$k_1$		$l_0$	$l_1$	$s_1$
-1	60	5	41	31	-33/70	0	-138	66	-1		54	-33/70
-1	34	0	27	11	-61/140	0	-128	46			-26	-61/140
$-1 \\ -1$	85 61	$-16 \\ -13$	61 60 -	$   \begin{array}{r}     27 \\     -10   \end{array} $	$-2/5 \\ -51/140$	0	$-58 \\ -44$	26 -8		$\frac{57}{42}$	$^{19}_{-11}$	$-2/5 \\ -51/140$
-1	51	$\frac{-13}{21}$	40	34	-31/140 $-23/70$	0	-44 $-4$	-8 2		-2	-11	-31/140 $-23/70$
-1	69	-20	51	17	-41/140	0	-106	43			-24	-41/140
-1	31	-13	24	5	-9/35	0	-88	32	_	47	-42	-9/35
-1	31	-3	20	14	-31/140	0	-77	14			-38	-31/140
$-1 \\ -1$	$\frac{11}{41}$	$-3 \\ -9$	10 40	$^{0}_{-6}$	$-13/70 \\ -3/20$	0	$-108 \\ -48$	42 12		$\frac{82}{47}$	$-21 \\ 9$	$-13/70 \\ -3/20$
-1	7	1	5	4	-4/35	0	-18	6		17	3	-4/35
-1	51	-13	40	10	-11/140	0	-44	22	_	37	-2	-11/140
-1	85	-26		-13	-3/70	0	-91	-42			-68	-3/70
$-1 \\ -1$	87 85	$-29 \\ 0$	$\frac{74}{51}$	$\frac{5}{47}$	-1/140 $1/35$	0	$-28 \\ -42$	-4 $-11$		26 28	$-7 \\ -28$	-1/140 $1/35$
$-1 \\ -1$	37	11	30	20	9/140	0	-42 -98	-11 -8			$-28 \\ -57$	9/140
-1	74	5	51	37	1/10	0	-118	26			23	1/10
-1	31	7	29	10	19/140	0	-108	12	_	87	-26	19/140
-1	50	-11	31	21	6/35	0	-34	2			-17	6/35
$-1 \\ -1$	$\frac{71}{97}$	$-13 \\ -9$	45 85	30 14	$\frac{29/140}{17/70}$	0	$-108 \\ -68$	$^{36}_{-14}$			$-42 \\ -17$	$\frac{29/140}{17/70}$
-1	45	0	41	7	39/140	0	-204	42	-1		23	39/140
-1	69	-30	67 -	-19	11/35	0	-122	9	_	68	-68	11/35
-1	125	-56		-33	7/20	0	-157	54	-1		-34	7/20
-1	60	14	47	31 7	27/70	0	-82	3			-34	27/70
$-1 \\ -1$	29 45	$-10 \\ -6$	21 31	17	59/140 16/35	0	-124 $-101$	62 38	-1 -		$^{23}_{-18}$	59/140 16/35
-1	47	-19		-10	69/140	0	-117	-2			-18	69/140
					· · · · · · · · · · · · · · · · · · ·							
			th struc	tures on					th str			
home		ism clas	th struc	tures on chenburg	-Kruggel spaces	home		ism cla	ss of I	Eschei	nburg	-Kruggel spaces
home		ism clas	th struc	tures on chenburg $p_1 = 2, s$	-Kruggel spaces	home		ism cla	ss of I $s = 2$	Eschei	nburg	
sum	$^{\rm with}_{k_0}$	ism clas $ r  = 5$ , $k_1$	th structure so of Eso $s = 2$ , $l_0$	tures on chenburg $p_1 = 2, s$ $l_1$	-Kruggel spaces $s_2 = 1/3$ $s_1$	sum	with $k_0$	$ \sin c  = 5,$ $ k_1 $	s = 2	Escher 1, p <sub>1</sub> = l <sub>1</sub>	nburg	-Kruggel spaces $s_2 = 5/12$ $s_1$
	with	ism clas $ r  = 5$ ,	th structures of Esc s = 2,	tures on chenburg $p_1 = 2$ , $s$ $l_1$ $-41$	-Kruggel spaces $c_2 = 1/3$		with	sm  class r  = 5,	ss of I $s = 2$	Escher, $p_1 =$	nburg	-Kruggel spaces $2 = 5/12$
sum 1	with $k_0$ -125 -89 -105	ism clas $ r  = 5,$ $k_1$ $-5$	th structory series of Escape $s = 2$ , the structory $l_0$ and $l_0$ and $l_0$ and $l_0$ and $l_0$ are structory $l_0$ and $l$	tures on chenburg $p_1 = 2$ , s $l_1$ $-41$ $-36$ $14$	-Kruggel spaces $s_2 = 1/3$ $s_1$ $-33/70$	-1 -1 -1	with   k <sub>0</sub> 65 126 25	ism cla $r  = 5,$ $k_1$ $19$	$s = 2$ $l_0$ $46$	Escher l, p <sub>1</sub> = l <sub>1</sub> 42	nburg	-Kruggel spaces $2 = 5/12$ $\begin{array}{r} s_1 \\ \hline -33/70 \end{array}$
1 1 1 1	with $k_0$ -125 -89 -105 -96	ism clas $ r  = 5,$ $k_1$ $-5$ $-25$ $51$ $39$	th structory series of Escape $s = 2$ , $l_0 = -102$ $-81$ $-97$ $-65$	tures on chenburg $p_1 = 2$ , $s_1$ $l_1$ $-41$ $-36$ $l_4$ $-29$	-Kruggel spaces $s_2 = 1/3$ $s_1$ $-33/70$ $-61/140$ $-2/5$ $-51/140$	-1 -1 -1 -1	with   k <sub>0</sub> 65 126 25 42	ism cla $r  = 5,$ $k_1$ $19$ $-49$ $5$ $-9$	$s = 2$ $l_0$ $s = 2$ $l_0$ $s = 46$ $s = 16$ $s = 25$	42 39 16 19	nburg	-Kruggel spaces $_2 = 5/12$ $\begin{array}{c} s_1 \\ \hline -33/70 \\ -61/140 \\ -2/5 \\ -51/140 \end{array}$
1 1 1 1 1	with $k_0$ -125 -89 -105 -96 -105	ism class $ r  = 5$ , $k_1$ $-5$ $-25$ $51$ $39$ $35$	th structs of Ess $s = 2$ , $l_0$ $-102$ $-81$ $-97$ $-65$ $-92$	tures on chenburg $p_1 = 2$ , $s_1$ $l_1$ $-41$ $-36$ $l_4$ $-29$ $-1$	-Kruggel spaces $s_2 = 1/3$ $s_1$ $-33/70$ $-61/140$ $-2/5$ $-51/140$ $-23/70$	-1 -1 -1 -1 -1	with $ k_0 $ 65 126 25 42 111	ism cla $r  = 5,$ $k_1$ 19  -49  5  -9  12	$s = 2$ $l_0$ $s = 2$ $l_0$ $s = 2$	42 39 16 19 49	nburg	-Kruggel spaces $_2 = 5/12$ $s_1$ $-33/70$ $-61/140$ $-2/5$ $-51/140$ $-23/70$
sum  1 1 1 1 1 1 1 1 1 1	with $k_0$ $-125$ $-89$ $-105$ $-96$ $-105$ $-85$	ism clas  r  = 5, $k_1$ -5 -25 51 39 35 -5	th structs of Ess $s = 2$ , $l_0$ $-102$ $-81$ $-97$ $-65$ $-92$ $-81$	tures on chenburg $p_1 = 2$ , $s_{l_1}$ $-41$ $-36$ $14$ $-29$ $-1$ $-12$	$\begin{array}{c} \text{-Kruggel spaces} \\ s_1 \\ \hline s_1 \\ \hline s_1 \\ \hline -33/70 \\ -61/140 \\ -2/5 \\ -51/140 \\ -23/70 \\ -41/140 \\ \end{array}$	sum -1 -1 -1 -1 -1 -1 -1 -1	with $ k_0 $ 65 126 25 42 111 146	ism cla $r =5,$ $k_1$ 19  -49 $5$ -9 $12$ -58	$s = 2$ $l_0$ 46 $85$ $16$ $25$ $85$ $119$	Escher 1, p <sub>1</sub> = 1 42 39 16 19 49 15	nburg	-Kruggel spaces $_2 = 5/12$ $\begin{array}{r} s_1 \\ \hline -33/70 \\ -61/140 \\ -2/5 \\ -51/140 \\ -23/70 \\ -41/140 \end{array}$
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sum  1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	with $k_0$ -125 -89 -105 -96 -105 -85 -169 -161 -125 -126	ism clas  r  = 5, $k_1$ -5 -25 51 39 35 -5 -5 4 -5 -41	th structs of Eses $s = 2$ , $l_0 = 100$ $-102$ $-81$ $-97$ $-65$ $-92$ $-81$ $-102$ $-145$ $-81$ $-89$	tures on chenburg $p_1 = 2$ , $s$ $l_1$ $-41$ $-36$ $14$ $-29$ $-1$ $-12$ $-96$ $-25$ $-66$ $-85$	-Kruggel spaces $\frac{s_1}{s_2} = 1/3$ $\begin{array}{r} s_1 \\ -33/70 \\ -61/140 \\ -2/5 \\ -51/140 \\ -23/70 \\ -41/140 \\ -9/35 \\ -31/140 \\ -13/70 \\ -3/20 \\ \end{array}$	sum -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1	with $\begin{vmatrix} k_0 \end{vmatrix}$ 65 126 25 42 111 146 169 31 35 86	ism cla $r  = 5, k_1$ $19$ $-49$ $5$ $-9$ $12$ $-58$ $-45$ $-8$ $-1$ $-9$	$s = 2 \\ l_0 \\ \hline \\ 46 \\ 85 \\ 16 \\ 25 \\ 85 \\ 119 \\ 126 \\ 25 \\ 31 \\ 55$	Escher $l, p_1 = \frac{l_1}{42}$ $\frac{42}{39}$ $\frac{16}{19}$ $\frac{49}{49}$ $\frac{15}{42}$ $\frac{6}{39}$	nburg	$ \begin{array}{c} \text{-Kruggel spaces} \\ 2 = 5/12 \\ \hline \\ -33/70 \\ -61/140 \\ -2/5 \\ -51/140 \\ -23/70 \\ -41/140 \\ -9/35 \\ -31/140 \\ -13/70 \\ -3/20 \\ \end{array} $
sum  1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	with $k_0$ -125 -89 -105 -96 -105 -85 -169 -161 -125 -126 -36	$ r  = 5, \\ k_1$ $-5$ $-25$ $51$ $39$ $35$ $-5$ $-5$ $-41$ $-17$	th structs of Ess $s = 2$ , $l_0$ $-102$ $-81$ $-97$ $-65$ $-92$ $-81$ $-102$ $-145$ $-81$ $-89$ $-29$	tures on chenburg $p_1 = 2$ , $s$ $l_1$ $-41$ $-36$ $14$ $-29$ $-1$ $-12$ $-96$ $-25$ $-66$ $-85$ $-25$	$ \begin{array}{c} \text{-Kruggel spaces} \\ \text{-}2 = 1/3 \\ \hline \\ & -33/70 \\ -61/140 \\ -2/5 \\ -51/140 \\ -23/70 \\ -41/140 \\ -9/35 \\ -31/140 \\ -13/70 \\ -3/20 \\ -4/35 \\ \end{array} $	sum -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1	$\begin{array}{c} \text{with} \mid \\ k_0 \\ \\ 65 \\ 126 \\ 25 \\ 42 \\ 111 \\ 146 \\ 169 \\ 31 \\ 35 \\ 86 \\ 129 \\ \end{array}$	ism cla $r  = 5, k_1$ $19$ $-49$ $5$ $-9$ $12$ $-58$ $-45$ $-8$ $-1$ $-9$ $-35$	$s = 2 \\ l_0 \\ \hline \\ 46 \\ 85 \\ 16 \\ 25 \\ 85 \\ 119 \\ 126 \\ 25 \\ 31 \\ 55 \\ 96 \\ \hline$	Escher $l, p_1 = \frac{l_1}{42}$ $\frac{42}{39}$ $\frac{16}{19}$ $\frac{49}{49}$ $\frac{15}{42}$ $\frac{6}{39}$ $\frac{39}{32}$	nburg	-Kruggel spaces $_2 = 5/12$ $\begin{array}{r} s_1 \\ \hline -33/70 \\ -61/140 \\ -2/5 \\ -51/140 \\ -23/70 \\ -41/140 \\ -9/35 \\ \hline -31/140 \\ -13/70 \\ -3/20 \\ -4/35 \\ \end{array}$
sum  1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	with $k_0$ -125 -89 -105 -96 -105 -85 -169 -161 -125 -126	ism clas  r  = 5, $k_1$ -5 -25 51 39 35 -5 -5 4 -5 -41	th structs of Eses $s = 2$ , $l_0 = 100$ $-102$ $-81$ $-97$ $-65$ $-92$ $-81$ $-102$ $-145$ $-81$ $-89$	tures on chenburg $p_1 = 2$ , $s$ $l_1$ $l_1$ $l_2$ $l_3$ $l_4$ $l$	-Kruggel spaces $\frac{s_1}{s_2} = 1/3$ $\begin{array}{r} s_1 \\ -33/70 \\ -61/140 \\ -2/5 \\ -51/140 \\ -23/70 \\ -41/140 \\ -9/35 \\ -31/140 \\ -13/70 \\ -3/20 \\ \end{array}$	sum -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1	with $\begin{vmatrix} k_0 \end{vmatrix}$ 65 126 25 42 111 146 169 31 35 86	ism cla $r  = 5, k_1$ $19$ $-49$ $5$ $-9$ $12$ $-58$ $-45$ $-8$ $-1$ $-9$	$s = 2 \\ l_0 \\ \hline \\ 46 \\ 85 \\ 16 \\ 25 \\ 85 \\ 119 \\ 126 \\ 25 \\ 31 \\ 55$	Escher $l, p_1 = \frac{l_1}{42}$ $\frac{42}{39}$ $\frac{16}{19}$ $\frac{49}{49}$ $\frac{15}{42}$ $\frac{6}{39}$	nburg	$ \begin{array}{c} \text{-Kruggel spaces} \\ 2 = 5/12 \\ \hline \\ -33/70 \\ -61/140 \\ -2/5 \\ -51/140 \\ -23/70 \\ -41/140 \\ -9/35 \\ -31/140 \\ -13/70 \\ -3/20 \\ \end{array} $
sum  1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	$\begin{array}{c} \text{with} \\ k_0 \\ -125 \\ -89 \\ -105 \\ -96 \\ -105 \\ -85 \\ -169 \\ -161 \\ -125 \\ -126 \\ -36 \\ -129 \\ -185 \\ -145 \\ \end{array}$	ism class $r =5$ , $k_1$ $-5$ $-25$ $51$ $39$ $35$ $-5$ $-41$ $-17$ $35$ $91$ $55$	th structs of Esc $s=2$ ; $l_0$ = 102 - 81 - 102 - 145 - 89 - 29 - 106 - 162 - 137	tures on chenburg $p_1 = 2$ , $s$ $l_1$ $-41$ $-36$ $14$ $-29$ $-1$ $-12$ $-96$ $-25$ $-66$ $-85$ $-25$ $-17$ $4$ $4$ $24$	$\begin{array}{c} \text{-Kruggel spaces} \\ \text{-}2 = 1/3 \\ \hline \\ & -33/70 \\ -61/140 \\ -2/5 \\ -51/140 \\ -23/70 \\ -41/140 \\ -9/35 \\ -31/140 \\ -13/70 \\ -3/20 \\ -4/35 \\ -11/140 \\ -3/70 \\ -1/140 \\ \end{array}$	sum  -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1	with $\begin{vmatrix} k_0 \end{vmatrix}$ 65 126 25 42 111 146 169 31 35 86 129 52 86 49	$\begin{array}{c} \text{ism cla} \\ r =5, \\ \hline k_1 \\ \hline \\ 19 \\ -49 \\ 5 \\ -9 \\ 12 \\ -58 \\ -45 \\ -8 \\ -1 \\ -9 \\ -35 \\ -4 \\ 42 \\ -15 \\ \end{array}$	$\begin{array}{c} \text{ass of I} \\ s = 2 \\ l_0 \\ \hline \\ 46 \\ 85 \\ 16 \\ 25 \\ 85 \\ 119 \\ 126 \\ 25 \\ 31 \\ 55 \\ 96 \\ 45 \\ 75 \\ 36 \\ \end{array}$	Escher, $p_1 = \frac{l_1}{l_1}$ 42  39  16  19  49  15  42  5  6  39  32  9  55  12	nburg	
sum  1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	$\begin{array}{c} \text{with} \\ k_0 \\ -125 \\ -89 \\ -105 \\ -96 \\ -105 \\ -85 \\ -169 \\ -161 \\ -125 \\ -126 \\ -36 \\ -129 \\ -185 \\ -145 \\ -169 \end{array}$	ism class $ r  = 5$ , $ k_1  = $	th structs of Ess $s=2$ , $l_0$	tures on chenburg $p_1 = 2$ , $s$ $l_1$ $-41$ $-36$ $14$ $-29$ $-12$ $-96$ $-25$ $-66$ $-85$ $-25$ $-17$ $4$ $24$ $-2$	-Kruggel spaces $_{12}=1/3$ $\begin{array}{r} s_1\\ -33/70\\ -61/140\\ -2/5\\ -51/140\\ -23/70\\ -41/140\\ -9/35\\ -31/140\\ -13/70\\ -3/20\\ -4/35\\ -11/140\\ -3/70\\ -1/140\\ -3/70\\ -1/140\\ 1/35 \end{array}$	sum  -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1	with $\begin{vmatrix} k_0 \end{vmatrix}$ 65 126 25 42 111 146 169 31 35 86 129 52 86 49 9	$\begin{array}{c} \text{ism cla} \\ r =5, \\ k_1 \\ \hline \\ 19 \\ -49 \\ 5 \\ -9 \\ 12 \\ -58 \\ -45 \\ -8 \\ -1 \\ -9 \\ -35 \\ -4 \\ 42 \\ -15 \\ -5 \\ \end{array}$	$\begin{array}{c} \text{ass of I} \\ s = 2 \\ l_0 \\ \hline \\ 46 \\ 85 \\ 16 \\ 25 \\ 85 \\ 119 \\ 126 \\ 25 \\ 31 \\ 55 \\ 96 \\ 45 \\ 75 \\ 36 \\ 6 \\ \end{array}$	Escher, $p_1 = \frac{l_1}{l_1}$ 42  39  16  19  49  15  42  5  6  39  32  9  55  12  2	nburg	$ \begin{array}{c} \text{-Kruggel spaces} \\ 2 = 5/12 \\ \hline \\ & -33/70 \\ -61/140 \\ & -2/5 \\ -51/140 \\ -23/70 \\ -41/140 \\ -9/35 \\ -31/140 \\ -13/70 \\ -3/20 \\ -4/35 \\ -11/140 \\ -3/70 \\ -1/140 \\ 1/35 \end{array} $
sum  1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	$\begin{array}{c} \text{with} \\ k_0 \\ \hline \\ -125 \\ -89 \\ -105 \\ -96 \\ -105 \\ -86 \\ -169 \\ -161 \\ -125 \\ -129 \\ -185 \\ -145 \\ -169 \\ -86 \\ \end{array}$	$ \begin{aligned} &\text{ism class} \\ &r =5, \\ &k_1 \end{aligned} \\ &-5 \\ &-25 \\ &51 \\ &39 \\ &35 \\ &-5 \\ &-4 \\ &-5 \\ &-41 \\ &-17 \\ &35 \\ &91 \\ &55 \\ &15 \\ &39 \end{aligned} $	th struc ss of Ess $s=2$ , $l_0$ -102 -81 -97 -65 -92 -81 -102 -145 -89 -29 -106 -162 -137 -161 -162 -162 -162 -163	tures on chenburg $p_1 = 2$ , $s$ $l_1$ $-41$ $-36$ $14$ $-29$ $-1$ $-12$ $-96$ $-25$ $-66$ $-85$ $-25$ $-17$ $4$ $24$ $-2$ $31$	$\begin{array}{c} \text{-Kruggel spaces} \\ \frac{s_1}{2} = 1/3 \\ \hline \\ -33/70 \\ -61/140 \\ -2/5 \\ -51/140 \\ -23/70 \\ -41/140 \\ -9/35 \\ -31/140 \\ -13/70 \\ -3/20 \\ -4/35 \\ -11/140 \\ -3/70 \\ -1/140 \\ 1/35 \\ 9/140 \\ \end{array}$	sum  -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1	with $\begin{vmatrix} k_0 \end{vmatrix}$ 65 126 25 42 111 146 169 31 35 86 129 52 86 49 9 79	$\begin{array}{c} \text{ism cla} \\ r =5, \\ k_1 \\ \hline \\ 19 \\ -49 \\ 5 \\ -9 \\ 12 \\ -58 \\ -45 \\ -8 \\ -1 \\ -9 \\ -35 \\ -4 \\ 42 \\ -15 \\ -5 \\ -25 \\ \end{array}$	$\begin{array}{c} \text{ass of I} \\ s = 2 \\ l_0 \\ \hline \\ 46 \\ 85 \\ 16 \\ 25 \\ 85 \\ 119 \\ 126 \\ 25 \\ 31 \\ 55 \\ 96 \\ 45 \\ 75 \\ 36 \\ 66 \\ 66 \\ \end{array}$	Escher, $p_1 = \frac{l_1}{42}$ $\frac{39}{16}$ $19$ $49$ $15$ $6$ $39$ $32$ $9$ $55$ $12$ $2$ $7$	nburg	$ \begin{array}{c} \text{-Kruggel spaces} \\ 2 = 5/12 \\ \hline \\ -33/70 \\ -61/140 \\ -2/5 \\ -51/140 \\ -23/70 \\ -41/140 \\ -9/35 \\ -31/140 \\ -13/70 \\ -4/35 \\ -11/140 \\ -3/70 \\ -1/140 \\ 1/35 \\ 9/140 \end{array} $
sum  1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	$\begin{array}{c} \text{with} \\ k_0 \\ \hline \\ -125 \\ -89 \\ -105 \\ -96 \\ -105 \\ -85 \\ -169 \\ -161 \\ -125 \\ -126 \\ -36 \\ -129 \\ -185 \\ -145 \\ -169 \\ -86 \\ -85 \\ \end{array}$	$ \begin{aligned} &\text{ism class} \\ &r =5, \\ &k_1 \end{aligned} \\ &-5 \\ &-25 \\ &51 \\ &39 \\ &35 \\ &-5 \\ &-41 \\ &-17 \\ &35 \\ &91 \\ &55 \\ &15 \\ &39 \\ &11 \end{aligned} $	$\begin{array}{c} \text{th struc} \\ \text{ss of Ess} \\ \text{s} = 2, \\ l_0 \\ l_0 \\ \text{-}102 \\ -81 \\ -97 \\ -655 \\ -92 \\ -81 \\ -102 \\ -145 \\ -81 \\ -89 \\ -89 \\ -106 \\ -162 \\ -137 \\ -161 \\ -85 \\ -82 \end{array}$	tures on chenburg $p_1 = 2$ , $s$ $l_1$ $-41$ $-36$ $14$ $-29$ $-1$ $-12$ $-96$ $-25$ $-66$ $-85$ $-25$ $-17$ $4$ $24$ $-2$ $31$ $4$	$\begin{array}{c} \text{-Kruggel spaces} \\ \text{-}2 = 1/3 \\ \hline \\ & -33/70 \\ -61/140 \\ -2/5 \\ -51/140 \\ -2/5 \\ -51/140 \\ -2/3/70 \\ -41/140 \\ -9/35 \\ -31/140 \\ -13/70 \\ -3/20 \\ -4/35 \\ -11/140 \\ -3/70 \\ -1/140 \\ 1/35 \\ 9/140 \\ 1/10 \\ \end{array}$	sum  -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1	$\begin{array}{c c} \text{with} \mid \\ \hline & 65 \\ 126 \\ 25 \\ 42 \\ 111 \\ 146 \\ 169 \\ 31 \\ 35 \\ 86 \\ 129 \\ 52 \\ 86 \\ 49 \\ 9 \\ 79 \\ 39 \\ \end{array}$	$\begin{array}{c} \text{ism cla} \\ r =5, \\ k_1 \\ \hline \\ 19 \\ -49 \\ 5 \\ -9 \\ 12 \\ -58 \\ -4 \\ -45 \\ -8 \\ -1 \\ -9 \\ -35 \\ -4 \\ 42 \\ -15 \\ -25 \\ 5 \\ \end{array}$	$\begin{array}{c} \text{ss of I} \\ s = 2 \\ l_0 \\ \hline \\ 46 \\ 85 \\ 16 \\ 25 \\ 85 \\ 119 \\ 126 \\ 25 \\ 31 \\ 55 \\ 96 \\ 45 \\ 75 \\ 36 \\ 66 \\ 66 \\ 26 \\ \end{array}$	Escher, $p_1 = \frac{l_1}{42}$ $\frac{39}{16}$ $19$ $49$ $15$ $6$ $39$ $32$ $9$ $55$ $12$ $2$ $7$ $22$	nburg	$ \begin{array}{l} \text{-Kruggel spaces} \\ 2 = 5/12 \\ \hline \\ & s_1 \\ \hline \\ & -33/70 \\ & -61/140 \\ & -2/5 \\ & -51/140 \\ & -23/70 \\ & -41/140 \\ & -9/35 \\ & -31/140 \\ & -13/70 \\ & -3/20 \\ & -4/35 \\ & -11/140 \\ & -3/70 \\ & -1/140 \\ & 1/35 \\ & 9/140 \\ & 1/10 \\ \end{array} $
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5.4. **Appendix D.** The graphs in figure 2 depict the outcome of some time trials that compared alternative methods of computing the invariants of the Eschenburg-Kruggel spaces. The C++ code is significantly faster. The sole exception to this statement is when  $\max |k| \leq 4$ . The reason for this apparent anomaly is that the C++ code search and found the Eschenburg-Kruggel spaces in addition to computing their invariants; the Maple code merely computed the invariants.

The time trials were conducted on a quad-core Intel Xeon 5148 with an overclocked 2.33GHz cpu, a 4MB cache, 3.2GB ram memory, and 8.4GB swap memory.

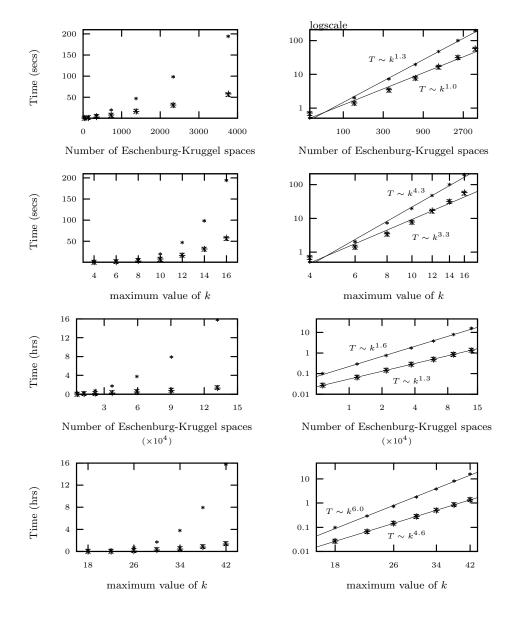


Figure 2: Even rows: Computation time versus the number, N=N(k), of Eschenburg-Kruggel spaces in the cube  $[-k,k]^6$  with  $\sum_i k_i = \sum_i l_i \in [0,2]$ ; Odd rows: Computation time versus the number k. The right column shows the same data in log-scale. \*=MAPLE [11] times; +, x=C++-times.

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School of Mathematics and the Maxwell Institute of Mathematical Sciences, 6214 James Clerk Maxwell Building, The University of Edinburgh, Edinburgh, UK, EH9 3JZ  $E ext{-}mail\ address: l.butler@ed.ac.uk}$ 

URL: http://www.maths.ed.ac.uk/~lbutler/